

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY**

SYMBIONT SCIENCE, ENGINEERING
AND CONSTRUCTION, INC.; ZURICH
AMERICAN INSURANCE COMPANY
a/s/o Symbiont Science, Engineering and
Construction, Inc.; AMERICAN
GUARANTEE AND LIABILITY
INSURANCE COMPANY, a/s/o Symbiont
Science, Engineering and Construction, Inc.;
and STEADFAST INSURANCE
COMPANY a/s/o Symbiont Science,
Engineering and Construction, Inc.,

Plaintiffs,

vs.

GROUND IMPROVEMENT SERVICES,
INC.; JOHN DOES 1-10, (fictitious parties)
and ABC COMPANIES 1-10 (fictitious
parties); GEOSTRUCTURES OF
VIRGINIA, INC.,

Defendants.

GROUND IMPROVEMENT SERVICES,
INC. and GEOSTRUCTURES, INC.,

Third-Party Plaintiffs,

vs.

GEOPIER FOUNDATION COMPANY,
INC., and GZA GEOENVIRONMENTAL,
INC.,

Third-Party Defendants.

**THIRD-PARTY COMPLAINT BY DEFENDANTS GROUND
IMPROVEMENT SERVICES, INC. and GEOSTRUCTURES,
INC. AGAINST GZA GEOENVIRONMENTAL, INC.**

Defendants/Third-Party Plaintiffs Ground Improvement Services, Inc. (“GIS”) and

GeoStructures, Inc. d/b/a GeoStructures of Virginia, Inc. (“GeoStructures,” collectively with GIS, “Third-Party Plaintiffs”), by their undersigned counsel, for their Third-Party Complaint against Third-Party Defendants GZA Geoenvironmental, Inc. (“GZA”), allege as follows:

PARTIES

1. GIS is a corporation organized under the laws of the State of Delaware with its principal place of business located in Virginia.

2. GeoStructures is a corporation organized under the laws of the Commonwealth of Virginia with its principal place of business located in Virginia.

3. Upon present information and belief, GZA is a corporation organized under the laws of Massachusetts with its principal place of business located in Massachusetts.

4. Upon present information and belief, GZA is registered to do business in New Jersey and regularly conducts business in New Jersey.

JURISDICTION

5. The Court has subject matter jurisdiction over Third-Party Plaintiffs’ claims under 28 U.S.C. § 1367(a) because they are so related to the Plaintiffs’ claims that they form part of the same case or controversy under Article III of the United States Constitution.

6. The Court has subject matter jurisdiction over Third-Party Plaintiffs’ claims under 28 U.S.C. § 1332 because there is complete diversity of citizenship between Third-Party Plaintiffs and Third-Party Defendants.

7. GIS is a citizen of Delaware and Virginia, GeoStructures is a citizen of Virginia, Geopier is a citizen of Georgia and North Carolina, and GZA is a citizen of Massachusetts.

8. Further, the Court has subject matter jurisdiction over Third-Party Plaintiffs’

claims under 28 U.S.C. § 1332 because the amount in controversy exceeds \$75,000, exclusive of interest and costs.

VENUE

9. Venue is proper in this district under the doctrine of ancillary venue and pursuant to 28 U.S.C. § 1391(b)(2) and (b)(3) in that a substantial part of the events or omissions giving rise to the claim occurred in this district and that Third-Party Defendants are subject to personal jurisdiction in this district with respect to this action.

FACTS

10. GIS is a contractor that provides, among other things, ground improvement construction services.

11. GeoStructures provides ground improvement design services to GIS.

12. GZA provides geotechnical, environmental, water, ecological, and construction management services for private and public clients.

13. Trenton Biogas, a food waste recycling and renewable energy company sought to build a food waste recycling and renewable energy facility in Trenton, New Jersey.

14. Plaintiff Symboint Science, Engineering and Construction, Inc. (“Symbiont”) was the design-build contractor for Trenton Biogas, and entered into a contract for the digester design, permitting, and construction services on the project.

15. GZA provided two geotechnical reports to Trenton Biogas, LLC, to provide foundation design and related earthwork recommendations for a project by Trenton Biogas.

16. The two reports were sent by GZA to Trenton Biogas on or about June 28, 2013, and January 5, 2018, respectively.

17. A true and accurate copy of the report dated June 28, 2013 (the “2013 Report”) is attached hereto as Exhibit A.

18. A true and accurate copy of the report dated January 5, 2018 (the “2018 Report”) is attached hereto as Exhibit B.

19. On or about January 30, 2018, GIS submitted Quotation/Contract No. 1 (the “Quotation”) to Symbiont, offering to perform design and construction services for the installation of elements for foundation support for tanks at a facility owned by Trenton Biogas.

20. A true and accurate copy of the Quotation is attached hereto as Exhibit C.

21. The Quotation provides, in part, as follows:

“Bid Documents and Applicable Contract Specifications:

1. Geotechnical Engineering Report, prepared by GZA, dated January 5, 2018^{1.4}

1.4 All RI elements are assumed to fully penetrate the uncontrolled fill as depicted in the Geotechnical Engineering Report/Soil Boring Logs and terminate in neutral soil.

1.5 Total post-construction settlements will be designed in accordance with the contract drawings, specifications, and addendum.”

22. On or about February 8, 2018, Symbiont and GIS entered a Subconsultant Professional Services Agreement (“Subconsultant Agreement”) where GIS agreed to perform certain soil improvement design services. The Quotation was incorporated into the Subconsultant Agreement.

23. A true and accurate copy of the Subconsultant Agreement is attached

hereto as Exhibit D.

24. A “Symbiont/Subcontractor Change Order” (“Change Order”) was signed by Symbiont on May 30, 2018, and by GIS on June 6, 2018.

25. A true and accurate copy of the “Change Order” is attached herto as Exhibit E.

26. Third-Party Plaintiffs relied upon the professional testing and recommendations included by GZA in its reports.

27. Third-Party Plaintiffs were not contracted to perform any additional soil testing on the job site.

28. On or about October 12, 2022, Plaintiffs Symbiont, Zurich American Insurance Company a/s/o Symbiont Science, Engineering and Construction, Inc, American Guarantee and Liability Insurance Company a/s/o Symbiont Science, Engineering and Construction, Inc, and Steadfast Insurance Company a/s/o Symbiont Science, Engineering and Construction, Inc., filed a Second Amended Complaint against GIS and GeoStructures of Virginia, Inc.

29. A true and accurate copy of the Second Amended Complaint is attached as Exhibit F.

30. In the Second Amended Complaint, Plaintiffs allege causes of action including, but not limited to, malpractice, negligence, breach of contract, breach of express and implied warranties, and seek indemnification as well as other damages.

COUNT ONE
PROFESSIONAL NEGLIGENCE

31. Third-Party Plaintiffs repeat and reallege the preceding paragraphs as if fully

set forth herein.

32. GZA provided engineering, testing, and other professional services regarding the development and construction of a soil improvement system at the Trenton Biogas facility.

33. GZA owed a duty to exercise reasonable care, technical skill, ability, and diligence ordinarily exercised by engineers and engineering firms in similar circumstances.

34. GZA's reports contained material defects and deficiencies.

35. GZA was aware Trenton Biogas would hire a contractor to perform services in detrimental reliance upon its reports.

36. It was foreseeable Trenton Biogas would hire a contractor that would rely upon the professional geotechnical engineering reports and boring data presented by GZA.

37. GZA breached its duties of care that it owed to all contractors and subconsultants working on the Trenton Biogas facility in reliance on GZA's reports.

38. GZA breached the duties of care it owed with respect to the design, development, and construction of the soil improvement system at the Trenton Biogas facility.

39. Third-Party Defendants deny that they are liable to the Plaintiffs for the claims asserted in the Second Amended Complaint.

40. However, if damages are awarded against Third-Party Plaintiffs, they are due solely to the negligence of GZA.

41. As a direct, proximate, and foreseeable result of the negligence of GZA, Third- Party Plaintiffs relied upon their reports and sustained damages, including, but not

limited to, substantial costs and expenses defending the lawsuit herein.

WHEREFORE, Third-Party Plaintiffs demand judgment against GZA for compensatory damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

COUNT TWO
NEGLIGENT
MISREPRESENTATION

42. Third-Party Plaintiffs repeat and reallege the preceding paragraphs as if fully set forth herein.

43. GZA provided engineering, testing and other professional services regarding the development and construction of a soil improvement system at the Trenton Biogas facility.

44. GZA owed a duty to exercise reasonable care, technical skill, ability and diligence ordinarily exercised by engineers and engineering firms in similar circumstances.

45. GZA's reports contained material misrepresentation of facts and material omissions.

46. GZA was aware Trenton Biogas would hire a contractor to perform services in detrimental reliance upon its reports.

47. Third-Party Plaintiffs reasonably relied upon the material misrepresentations and material omissions in GZA's reports to their detriment.

48. Third-Party Defendants deny that they are liable to the Plaintiffs for the claims asserted in the Second Amended Complaint.

49. However, if damages are awarded against Third-Party Plaintiffs, they are due solely to the misrepresentations of GZA.

WHEREFORE, Third-Party Plaintiffs demand judgment against GZA for compensatory damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

COUNT THREE
CONTRIBUTION

50. Third-Party Plaintiffs repeat and reallege the preceding paragraphs as if fully set forth herein.

51. Third-Party Plaintiffs denies that they are liable to the Plaintiffs for the claims asserted in the Second Amended Complaint.

52. However, if damages are awarded against Third-Party Plaintiffs, the damages allegedly sustained by the Plaintiffs resulted from the acts or omissions of GZA.

53. Pursuant to the Joint Torfeasors Contribution Law, N.J.S.A 2A:53A-1 and under the Comparative Negligence Act, N.J.S.A. 2A:15-5.1, Third-Party Plaintiffs demand contribution against Geopier.

WHEREFORE, Third-Party Plaintiffs demand judgment against GZA for contribution, and such other relief as the Court deems just and equitable.

COUNT FOUR
INDEMNIFICATION

54. Third-Party Plaintiffs repeat and reallege the preceding paragraphs as if fully set forth herein.

55. Third-Party Plaintiffs denies that they are liable to the Plaintiffs for the claims asserted in the Second Amended Complaint.

56. However, if judgment is awarded against the Third-Party Plaintiffs, Third-

Party Plaintiffs' liability, if any, was not morally culpable but was merely constructive, technical, imputed, or vicarious and that liability arose through the direct and primary liability of GZA.

WHEREFORE, Third-Party Plaintiffs demand judgment against GZA for all sums as may be found due against it in favor of the Plaintiffs, and such other relief as the Court deems just and equitable.

JURY DEMAND

Defendants/Third-Party Plaintiffs Ground Improvement Services, Inc. and Geostructures, Inc., hereby demand a trial by jury on all issues.

BY: /s/ John P. Morgenstern

John P. Morgenstern, Esquire

Michael T. Sweeney, Esquire

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*Attorneys for Defendants/Third Party
Plaintiffs, Ground Improvement Services,
Inc. and GeoStructures, Inc.*

Dated: November 4, 2022

CERTIFICATE OF SERVICE

I, John P. Morgenstern, Esquire, hereby certify that on the date set forth below, I did cause a true and correct copy of the foregoing Third-Party Complaint by Defendants Ground Improvement Services, Inc. and Geostructures, Inc. against GZA Geoenvironmental, Inc. to be filed with the Court's ECF/PACER electronic filing system, where it was available for immediate viewing and download to all counsel of record.

BY: /s/ John P. Morgenstern
John P. Morgenstern, Esquire
Michael T. Sweeney, Esquire

Dated: November 4, 2022

EXHIBIT A

GZA
GeoEnvironmental, Inc.

*Engineers and
Scientists*

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Nick Brancale
Adolfson & Peterson Construction
6701 West 23rd Street
Minneapolis, MN 55426



55 Lane Road
Suite 407
Fairfield
New Jersey
07004
973-774-3300
<http://www.gza.com>

Mr. Brian Blair
Trenton BioGas, LLC
1600 Lambertson Road
Trenton, NJ 08611

Re: Geotechnical Engineering Evaluation Report
Trenton BioGas, LLC
1600 Lambertson Road
Trenton, NJ 08611

Dear Mr. Blair:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide you with this geotechnical report for the above-referenced facility. The objective of our geotechnical services is to provide foundation design and related earthwork recommendations for your planned construction. The recommendations in this report are subject to the Limitations provided in Attachment A and our Terms and Conditions of Engagement.

BACKGROUND

The project is located at 1600 Lambertson Road in Trenton, Mercer County, New Jersey. Figure 1 presents the approximate location of the Site. The Site is greater than 3-acres in size and contains several existing structures, including the operating center building, a sludge dewatering & receiving building, a sludge drying building, scrubbers, an existing tank farm and electrical service switchgear.

Based on a review of the 2011 Trenton East, NJ-PA, 7.5-minute quadrangle topographic map, prepared by the U.S. Geological Survey (USGS), the Site is situated in an industrial setting surrounded by the urban area of Trenton at an elevation of approximately 20 feet above mean sea level (AMSL). The ground surface at the Site was observed to be generally flat. Regionally, the land is also generally flat with ground surface elevations between about 10 and 20 feet AMSL. A few small gently sloping hills are present approximately 4,000+ feet to the north-northeast and northwest that rise to about 40 feet AMSL.

The proposed construction consist of three, one million-gallon above ground storage tanks (ASTs) in the northeastern corner of the Site; plus, a similarly sized AST in the southeastern corner of the Site. An extension of an existing building (the sludge dewatering & receiving

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building), a smaller AST and a truck freight scale. Based on discussions with the client, each of the larger ASTs is approximately 55 feet in diameter and about 70 feet in height, supported on a 3-foot thick reinforced concrete slab-on-grade. GZA was not provided loading or settlement requirements for these planned structures. However, the structural engineer noted that loads of about 4,500 pounds per square foot (psf) are anticipated for the larger ASTs and about 2,000 psf for the smaller structures. We assume a maximum settlement of 1 to 2-inches is acceptable for the ASTs and less than 1-inch is acceptable for building structures. Also, a nominal differential settlement of ½-inch or less is considered tolerable at the various structures.

REGIONAL GEOLOGY

The Site is located in the physiogeologic province of the New Jersey Coastal Plain, just south of the Fall Line that separates the rock units of the northern New Jersey Piedmont from the unconsolidated Cretaceous sediments of the southern New Jersey Coastal Plain. According to a 2003 New Jersey Department of Environment Protection (NJDEP) hydrogeologic survey, elevations of the NJ Coastal Plain range from sea level to 400 feet ASML; however, more than half of the physiogeologic province exists below 50 feet AMSL.

According to the Geographic Information System (GIS) program “NJ-GeoWeb” available from the NJDEP, the surficial geology at the Site consists of salt-marsh and estuarine deposits of peat, organic silt and clay, sand and pebble gravel deposited during the Holocene sea-level rise. A wedge-shaped mass of unconsolidated and semi-consolidated siliciclastic sediments of Cretaceous and Cenozoic age, composed of alternating layers of clay, silt, sand, and gravel underlies the Coastal Plain of New Jersey, dipping gently to the southeast and thickening toward the Atlantic Ocean where it can reach a thickness of up to 6,000 feet.

The Site lies within the Duck Creek watershed in the Lower Delaware water region. The nearest body of water to the Site is the Delaware River which flows south to the Delaware Bay and separates Pennsylvania (to the west) and New Jersey (on the east). The property immediately adjacent to the south of the Site consists of small wetlands, which may have been affected by the release of water from the nearby municipal waste water treatment plant. Water-level measurements taken at existing monitoring wells on the Site indicate water levels at approximately 14 feet below ground surface.

SUBSURFACE EXPLORATIONS

Seven test borings (SB-1 through SB-7) were drilled by Craig Drilling Companies, Inc. of Mays Landing, NJ on May 15, 16, and 17, 2013. The approximate locations of the borings are indicated on Figure 2 and the logs are attached in Attachment B. Ground surface elevations were not available at the time of our investigation; but, the test borings were generally performed between Site elevation 18 and 20.

The borings were drilled using a mud-rotary drill rig equipped with safety hammers and automatic release systems for driving split spoon samplers in general accordance with ASTM D1586, the Standard Penetration Test (SPT). The SPT method consists of driving a

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1-3/8-inch ID, 24-inch long split spoon sampler with a 140-pound weight falling a vertical distance of 30 inches. The number of blows required for each 6-inch increment of penetration was recorded. The cumulative number of blows required for the 6- to 18- inch interval of penetration is referred to as the Standard Penetration Resistance, or N value, which is a commonly used indicator of soil density and consistency. The samples were collected semi-continuously for the first 10 feet and at 5-foot intervals thereafter. In areas of asphalt, borings were advanced the first 6 inches through asphalt and then sampled as indicated above.

Soil borings SB-1, SB-2, SB-3 and SB-4 were advanced to a depth of about 32 feet below existing ground surface (bgs). Soil boring SB-5 was advanced to a depth of about 47 feet bgs, and borings SB-6 and SB-7 were advanced to a depth of about 27 feet bgs.

A GZA field engineer was present during drilling activities to observe and record drilling activities, transfer soil samples directly from split spoons to sample jars, label soil samples, and prepare our field boring logs. The soils were described in accordance with the Burmister Soil Classification System. Split-spoon soil samples were transferred from the sampler to appropriate sample containers following opening of the split-spoon. Sample containers and Shelby tube samples were labeled with the project location, boring number, sample number, collection date and blow count. Split-spoon samples for soils laboratory testing were shipped to Thielsch Engineering of Cranston, RI.

Well Installation

GZA installed two 2-inch diameter temporary groundwater observation wells at the locations of geotechnical borings SB-2 (TW-2) and SB-4 (TW-1). The wells were installed to an approximate depth of 25 feet bgs and were completed with 5 feet of screen each. The portion of the test boring below a depth of about 25 feet (from the bottom of the test boring at 32 feet bgs to 25 feet bgs) had caved-in during temporary groundwater observation well installation.

GZA performed pneumatic slug tests at the temporary groundwater observation wells TW-1 and TW-2. Pneumatic slug testing utilizes positive pressure and vacuum to displace groundwater in the well to collect aquifer response data and estimate the hydraulic conductivity. Hydraulic conductivity is a measure of the ability of a material to facilitate water flow, and becomes more important as excavations extend to greater depths below the water table and hydraulic head differences increase. Data collected from the pneumatic slug tests was imported into the third-party software AQTESOLV to estimate hydraulic conductivity (K).

LABORATORY TESTING

Laboratory testing was performed on selected soil samples to estimate the soil index and engineering properties at the Site. Laboratory testing consisted of Atterberg Limits, natural moisture content determination, sieve analysis, and corrosion resistance testing (pH, sulfates, chlorides). The results are included in Attachment C, and are summarized below. The laboratory soil testing was performed in accordance with the following standard methods:

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- Atterberg Limits (ASTM D 4318)
- Water Content (ASTM D 2216)
- Gradation Analysis (ASTM D 422)
- Corrosivity Analysis (ASTM 4972)

Grain Size Analysis

Six soil samples were submitted for grain size analysis, as summarized in the below table.

Grain Size Analysis			
Boring	Sample	Depth (ft)	Classification
SB-1	S-6	10-12	Light brown fine SAND, trace Silt (SP-SM)
SB-2	S-8	20-22	Dark brown fine SAND, some Silt (SP-SM)
SB-3	S-8	20-22	Dark brown fine SAND, some Silt (SP-SM)
SB-6	S-3	4-6	Brown Organic SILT, little fine Sand (SM)
SB-6	S-7	20-22	Brown fine to course GRAVEL, some fine to course Sand, trace Silt (GW)
SB-7	S-7	20-22	Light brown fine SAND, little Silt (SP-SM)

Water Content and Atterberg Limit Analysis

The following soil samples were submitted for water content and Atterberg Limit analysis, as summarized in the below table.

Water Content Analysis						
Boring	Sample	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %
SB-3	S-6	10-12	97.6	98	53	45
SB-4	S-8	20-22	34.9	28	21	7
SB-4	S-10	30-32	24.0	31	19	12
SB-6	S-3	4-6	111.3	98	54	44

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Pocket Penetrometer and Torvane

The last three samples collected from test boring SB-5 were tested in our office for shear strength using a pocket penetrometer and torvane; the measured values are summarized below.

Pocket Penetrometer and Torvane				
Boring	Sample	Depth (ft)	Pocket Penetrom. (tsf)	Torvane (tsf)
SB-5	S-11	35-37	1.0	--
SB-5	S-12	40-42	2.2	2.5
SB-5	S-13	35-47	4.5	3.5

Corrosivity Testing

Five soil samples collected from the upper 4 feet of its respective test boring location were submitted for corrosivity testing. Each was analyzed for corrosivity parameters including pH, conductivity/resistivity, chloride, and sulfate. These tests were performed to evaluate the presence of alkali and likelihood of corrosion of steel and degradation of concrete foundations exposed to these soils. The laboratory results are included in Attachment C, and are summarized below:

Boring ID	Sample ID	Depth (ft)	pH Std. Units	Chloride (mg/kg)	Sulfate (mg/kg)
SB-1	S-1	0-2	6.41	ND	313
SB-2	S-1	0-2	7.04	ND	66
SB-3	S-2	2-4	6.93	ND	598
SB-4	S-2a	2-3	10.4	101	713
SB-6	S-2	2-4	7.58	ND	358

ND: Not detected above method detection limits

pH:

Soils usually have a pH range of 5 to 8. In this range, pH is not considered to be the dominant variable affecting corrosion rates. More acidic soils (pH less than 5), however, represent a serious corrosion/degradation risk to common construction materials such as steel and concrete. The results of the laboratory testing on 4 of the 5 samples, pH values between 6.4 and 7.6 indicate that pH is not of significant concern affecting corrosion potential. One sample (SB-4, S-2a, 2'to3' bgs), had a pH of 10.4, which is more basic than the remaining samples and could be indicative of the concrete fill that was observed within this sample interval.

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Sulfate:

The sulfate content ranged from 66 to 713 mg/kg or parts per million (ppm). This can also be expressed as 0.0066 to 0.0713 percent by weight. Table 4.3.1 of the ACI Building Code 318/318R lists the requirements for concrete exposed to sulfate containing solutions. Sulfate exposure ranges according to the ACI Table are as follows:

Sulfate Exposure	Water Soluble Sulfate in Soil (percent by weight)
Negligible	0.00 - 0.10
Moderate [†]	0.10 - 0.20
Severe	0.20 - 2.00
Very Severe	Over 2.00

[†] Exposure to seawater is equivalent to moderate sulfate exposure (ACI Table 4.3.1)

According to the American Concrete Institute manual (ACI 318-02), the amount of sulfate detected in the soil samples are considered to be negligible for concrete exposure and there are no special requirements for concrete exposed to these soils.

Chloride:

Chlorides are generally corrosive to both concrete and steel, as they participate directly in the electrochemical reactions that take place during the corrosion process. Chlorides typically attack metals and also have the ability to migrate through porous concrete and attack the steel reinforcement. This can cause corrosion and swelling of the steel reinforcement which can lead to cracks in the concrete and therefore accelerated corrosion activity. According to DM-5 (U.S. Department of the Navy, 1974), concentrations of chloride in water greater than 500 ppm can be “extremely corrosive” to carbon steel and cast iron. The chloride content ranged from “ND” to 101 parts per million (ppm), suggesting that there is a low risk of a chloride attack.

GENERALIZED SUBSURFACE CONDITIONS

Based on the soil borings performed during this subsurface exploration, the generalized soil stratigraphy, in a descending order, is summarized below. Refer to the boring logs and laboratory test results that are attached in Attachment B and C, respectively, for more detailed information.

A portion of the Site contained an asphalt concrete (paved) surface – see test boring locations SB-2, SB-4, SB-6 and SB-7. The surface at the remaining locations drilled consisted either of sandy fill (SB-1 and SB-3) or silty fill (SB-5). As noted below, fill soils were encountered within the upper portion of each test boring. It was difficult to distinguish between fill and indigenous soils unless obvious sign of fill were observed (concrete, wood, etc.). In general, fill soil is considered present to depths of between about 7 to 10 feet bgs.

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- Loose to medium dense sand fill, with lesser and variable amounts of gravel and silt was found at depths ranging from 0 to between 4 and 8 feet bgs in borings SB-2 through SB-5 along the eastern edge of the Site. Additionally, similar sand fill was encountered at SB-1. The uncorrected N values ranged from 4 to 49, with an uncorrected average N value of about 20.
- Medium dense silt fill with lesser and variable amounts of sand and gravel was encountered from 0 to 4 feet in SB-6 and SB-7 in the southwest corner of the Site. The uncorrected N values ranged from 9 to 16, with an uncorrected average N value of about 14.
- Medium dense silt and soft to medium stiff clayey silt or clay with little sand and organics was encountered underlying the surficial sand fill and/or silt fill layer at depths as shallow as about 4 feet (SB-6 and SB-7) to depths of about 8 to 10 feet (SB-1 through SB-5). This fine grained material is considered natural soil; however, it could also be fill as it is difficult to differentiate. This fine grained layer extended to depths of between 15 to 22 feet. The uncorrected N values ranged from the “Weight of Hammer” to 14, with an uncorrected average N value of about 6.
- Loose to medium dense, variable composition, sand and gravel, with lesser amounts of silt, or silt, with lesser amounts of sand, was encountered at depths between about 12 to 23 feet bgs at each test boring location except SB-4 and SB-5. At SB-4, the silt & clay layer extended to depths of at least 22 feet bgs. At SB-5, a soil sample was not recovered at the 20 to 22 foot interval. The uncorrected N values ranged from 5 to 28, with an uncorrected average N value of 13.
- Dense to very dense gravel, with some sand, or sand and gravel was encountered in each test boring at a depth of about 25 feet, and extended to the completion depth of each test boring except SB-4 and SB-5. This dense to very dense granular layer at least about 5-foot thick (SB-6 and SB-7) and extended to about 10-foot thick in SB-1 through SB-3. Lesser amounts of silt was also encountered within this soil layer. The uncorrected N values ranged from 35 to 84, with an uncorrected average N value of 50.
- In SB-4 and SB-5, a layer of very stiff to hard clay, with little sand was encountered underlying the gravel and sand from a depth of 30 feet until termination (at 32 feet in SB-4 and 47 feet in SB-5). The uncorrected N values ranged from 18 to 42, with an uncorrected average N value of 25.

Groundwater was not measured in the borings during drilling because water was added as a component of the mud-rotary drilling operation; however, ground water levels were determined by examining the relative saturation of soils as samples were collected. Water level readings were measured at an existing monitoring well on Site and within the temporary groundwater observation wells installed. The water table was encountered at about 14 feet bgs.



HYDRAULIC CONDITIONS

Slug testing at each of the two temporary wells installed displayed hysteretic effects likely due to the wells being under developed. In the several tests performed at TW-1, the estimated K ranged between 1.3 and 4.2 feet per day (ft/day) and averaged 2.4 ft/day. The K estimates at TW-2 ranged between 0.05 and 1.5 ft/day; the average is 1 ft/day. These values agree with published values for silty sands and fine sands (Fetter 1994). Although GZA was unable to verify the location and construction characteristics of an existing Site groundwater monitoring well (MW-3), the August 2009 Resource Control Corporation (RCC) Groundwater Remedial Investigation Report text states that the slug test estimated K at MW-3 is 30.5 ft/day. This K value corresponds to published values for well sorted sands or gravels; sands and gravels were identified at depths below 22 feet at SB-2 and 25 feet at SB-4.

Based on the subsurface conditions described in previous sections, the overburden soils observed at the Site range from organic rich fine grained sediments to gravels; therefore, hydraulic conductivity will also vary greatly. The rate of construction dewatering, if considered necessary based on the planned construction means and methods, will depend on several factors: 1) depth below the water table, 2) excavation into relatively high K material, 3) support of excavation, and 4) groundwater cutoff or dewatering method. Excavations below the water table would require additional permitting, dewatering operations (including pumping and treatment), and possible disposal costs.

IMPLICATIONS OF SUBSURFACE CONDITIONS

The existing fill is considered to be unsuitable for support of foundations, due to its variability in composition and relative density and consistency. Also, the underlying soft to medium fine grained soil layer is compressible, with settlement that could extend to 12-inches or more if loaded with a 4,500 psf bearing pressure.

In general, the apparent natural materials below a depth of 22 to 25 feet are considered to be a competent bearing material for support of the planned ASTs, truck scale, and building extension foundations. Therefore, it is recommended that deeper foundations be considered.

The structural engineer should consider whether to use a slab-on-grade or structural slab at the building expansion and/or new building location. If a slab-on-grade is used with a pile supported foundation, differential settlement may occur between the pile cap and the slab-on-grade. This differential settlement could be greater than ½-inch and may require periodic maintenance/repair. Slabs and footings designed to bear on grade should not tie into pile caps as cracking may occur due to the differential stiffness of the subgrade and pile caps. A subgrade modulus of 150 pci may be assumed for the design of slabs-on-grade.

Some ground improvement techniques may also provide a technically and cost effective solution for support of some foundations. We would recommend that ground improvement solutions be looked at more closely as the project progresses and further structural loading and settlement considerations are determined.

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GZA did consider three ground improvement options.

1. Excavation of the upper 10-feet of overburden soil or to about 2-feet above the ground water table, whichever is deeper; then placement of a geogrid geosynthetic layer; followed by replacement of the excavated granular soil using controlled compaction methods. The resulting settlement that may be experienced is still considered too large (6 to 18-inches) due to the underlying soft to medium fine grained compressible layer.
2. The amount of total settlement can be reduced through pre-loading the areas planned for construction, which involves the placement of a large soil mass over the area planned for construction for a defined period of time (generally 6-months or more), followed by removal of the soil mass prior to construction. It is anticipated that a 10-foot to 20-foot thick soil mass would be required, depending on location and final loading conditions.
3. The use of geopiers to improve the upper 25-feet of soil. GZA contacted GeoSystems to discuss this option and it is considered feasible. We would recommend that a geopier system be considered and evaluated further.

A ground water level of 10-feet bgs is recommended for design purposes.

Foundations should be placed at least 30-inches below exterior grades for frost protection or deeper if local building requirements specify a deeper depth.

CONCLUSIONS AND RECOMMENDATIONS

The following sections of this report provide foundation recommendations. As mentioned above and based on our assumptions, a deep foundation option is more suitable for the planned construction. The fill stratum and the organic silt and/or clay stratum are generally not suitable as foundation bearing materials in its current state. Therefore, shallow foundations are not generally feasible at this site. Driven H-piles, concrete filled pipe piles or drilled caissons (piers) can be considered for the AST foundations. Helical piles can also be considered for the lighter loaded structures. The drilled pier and helical pile options would limit vibration considerations associated with driving H-Piles or pipe piles. Other pile types such as auger-cast piles, may also be viable based on market conditions at the time of construction.

The useable pile capacity and pile type will be influenced by the final site grades, tip grades and penetration resistance at the end of driving. If the site grade is raised relative to the current site grade, this could lead to downdrag forces on the piles due to consolidation settlement of the clayey silt strata, and to a reduction in the useable pile capacity. We assume that the site grade will not be increased.

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Drilled Piers or Caissons

The allowable axial bearing and uplift capacities for a 24-inch diameter pier sizes with a 30 and 50 foot depth of embedment is shown on the table below. The allowable values shown are in tons.

Pier Diameter	Tip Depth BGS	Compressive Axial Design Capacity (tons)	Uplift Axial Design Capacity (tons)
24-Inches	30-feet	25	12
24-Inches	50-feet	65	30

General installation procedures recommended for drilled piers or caissons follows.

- Drilled piers shall be spaced no closer than three times the pier diameter (center to center) unless otherwise approved.
- The bottom of the drilled pier shall be cleared of as much of the remaining loose soil as possible.
- Reinforcement steel (rebar cage) is placed prior to concrete placement. Care shall be taken to minimize damage during installation and to secure the rebar cage in place to prevent movement during concrete placement.
- Concrete is pumped through casing until clean grout overtops the casing. The quantity of concrete pumped should be checked against the calculated volume of the pier.
- Pier or caisson installation logs shall be completed for each location. Information included shall, at a minimum, consist of pier designation, location, length, tip elevation, calculated and actual concrete quantity, reference elevation measurement, reinforcement steel data, concrete sample collected (yes or no), etc.
- A load test on either a production or indicator pier shall be conducted to assess the axial compression and tension/uplift suitability of the pier/caisson design.

Steel H-Piles

As an alternate to drilled piers or caissons, end-bearing steel H-piles may be utilized. Such piles would be driven to a specified design tip elevation. We have provided typical loads for a common H-pile driven to a tip elevation of 50-feet and 60-feet bgs. If additional loads are needed per pile, GZA can refine its analysis and consider deeper tip elevations or larger H-pile sections.

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H-Pile Size	Tip Depth BGS	Compressive Axial Design Capacity	Uplift Axial Design Capacity
	(feet)	(tons)	(tons)
HP-12x53	50	45	20
HP-12x53	60	60	30

Wave Equation analyses should be performed by the Contractor based on the actual hammer and pile size to confirm the driving criteria prior to installing piles.

In lieu of performing static pile load tests, we recommend at least 10 percent of all piles installed be dynamically tested utilizing a Pile Dynamic Analyzer (PDA) as manufactured by GRL, or equivalent. Prior to driving piles, the piling contractor should be required to submit a predictive dynamic pile analysis (WEAP analysis) for each pile type, soil condition, and/or proposed piling hammer in order to determine the driving resistance required to achieve an ultimate capacity equal to or greater than the design capacity multiplied by the safety factor plus twice the anticipated down drag force. Twice the down drag force is included in the load testing to account for the additional load that the pile tip may experience in the future and again to overcome that upward resistance provided by the fill soils at the time of testing. The WEAP analysis must show that the pile will not be overstressed at any point during driving. That analysis should be reviewed by GZA. Only after acceptance of the analysis, should the Contractor install piles.

The PDA testing program should consist of testing at least 2 percent of all piles during initial drive, for each pile hammer utilized, or after major maintenance of pile hammer.

Concrete-filled closed-end steel pipe piles

Piles consisting of steel pipe driven to a tip elevation of 50-feet and 60-feet bgs that are filled with concrete are considered. The piles are recommended to be driven closed ended to increase the amount of soil displacement and friction.

We have calculated design capacities as indicated in the Table below.

Outside Pile Diameter	Wall thickness	Tip Depth BGS	Concrete fill compressive strength	Compressive Axial Design Capacity	Uplift Axial Design Capacity
(in)	(in)	(feet)	(psi)	(tons)	(tons)
12.75	0.375	50	4000	35	20
12.75	0.375	60	4000	50	25

Wave Equation analyses should be performed by the Contractor based on the actual hammer and pile size to confirm the driving criteria prior to installing piles.

A 1 inch thick boot plate with a maximum diameter equal to or less than the outside pile diameters should be bevel-grooved welded to the pile tip and ground smooth to account for hard driving on obstructions. The plate and weld should not extend beyond the diameter of the pipe so that no separation between the pile and the ground exists after driving. Concrete in-fill may be placed by free-fall after the pipe has been sounded and determined to be straight, vertical, and clear of water.

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In lieu of performing static pile load tests, we recommend at least 10 percent of all piles installed be dynamically tested utilizing a Pile Dynamic Analyzer (PDA) as manufactured by GRL, or equivalent. Prior to driving piles, the piling contractor should be required to submit a predictive dynamic pile analysis (WEAP analysis) for each pile type, soil condition, and/or proposed piling hammer in order to determine the driving resistance required to achieve an ultimate capacity equal to or greater than the design capacity multiplied by the safety factor plus twice the anticipated down drag force. Twice the down drag force is included in the load testing to account for the additional load that the pile tip may experience in the future and again to overcome that upward resistance provided by the fill soils at the time of testing. The WEAP analysis must show that the pile will not be overstressed at any point during driving. That analysis should be reviewed by GZA. Only after acceptance of the analysis, should the Contractor install piles.

The PDA testing program should consist of testing at least 2 percent of all piles during initial drive, for each pile hammer utilized, or after major maintenance of pile hammer.

Helical Piles for Lighter Bearing Structures

There are planned smaller and lighter bearing structures considered at the site, including a potential scale house, truck scale and biogas storage tank. Helical piles (anchors) can be considered to support these structures instead of drilled piers or other deeper pile foundation option. To provide recommendations for a helical pier foundation system, we have assumed a building foundation wall load of 4,000 pounds per linear foot. To support such a structure, the following options can be considered.

1. Helical piers spaced at 6-foot on center, 14-inch diameter helix at a minimum depth of 25-feet below existing ground surface, with supporting equipment (square shaft, bracket, etc.) are considered capable of supporting an allowable load of 24,000 pounds.
2. Helical piers spaced 6-foot on center, consisting of two 10-inch diameter helices in a series placed at a depth of 25-feet and 28-feet, with the applicable supporting equipment (square shaft, bracket, etc.) are also considered capable of an allowable load of 24,000 pounds.

It is recommended that the final helical pile design be completed by the helical pile manufacturer or installer and stamped by a professional engineer registered in New Jersey.

Seismic Design

Based upon the limited subsurface information, it is GZA's opinion that the site soils are not considered liquefaction susceptible. GZA anticipates that the site soil profile is a Site Class D.

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The following seismic design values are in accordance with the 2009 International Building Code (as adopted by New Jersey), Section 1613:

<u>Parameter</u>	<u>Value</u>
Site Class (Stiff Soil Profile)	D
Maximum Considered Earthquake Spectral Response Accelerations for short period (S_{ms})	0.455 g
Maximum Considered Earthquake Spectral Response Accelerations for 1 second (S_{m1})	0.150 g

Underground Utilities

Underground pipes and utilities should be placed on bedding in accordance with the manufacturer's specifications. "Granular Fill" should be placed in lifts on the sides and above the utilities and compacted to at least 92 percent of the maximum dry density as determined in accordance with ASTM D-1557 (modified Proctor test). Compaction should be performed with hand-operated equipment with lift thickness depending on the size of equipment used. Should utilities be located below slabs and foundations, backfill should be compacted to at least 95 percent of the maximum dry density. Base and sub-base courses for pavements should also be compacted to 95 percent of the maximum dry density, if located over utilities.

Lateral Soil Pressure

Although we understand that no below grade structures are planned, the following lateral earth pressures are recommended for design of below grade structures, if plans change. These recommended pressures are based on our assumption that below grade walls or retaining walls will be backfilled with free-draining granular material (Sand-Gravel Fill within 3 feet laterally of the back of the wall), and that hydrostatic pressures are relieved by drainage. Foundation drains are recommended for any walls subject to unbalanced lateral earth pressures. If the foundations elevations are below the groundwater elevation (assume 10 feet below ground surface for design purposes) and the hydrostatic pressures are not relieved by drainage, hydrostatic pressures should be added to the lateral earth pressures. Surcharge loads, such as truck traffic, adjacent buildings, and embankment soils, should also be added to static loads for design.

- The recommended coefficient of friction for lateral sliding is 0.45 (concrete to soil). Backfill behind walls and embedded foundations should be compacted to at least 95 percent of the maximum dry density as determined in accordance with ASTM D-1557 (modified Proctor test).
- Retaining walls with level backfill that are restrained against rotation at the top (such as a basement wall) should be designed using an at-rest lateral pressure coefficient of 0.5 with an unsaturated unit soil weight of 125 pounds per cubic foot.
- Retaining walls that are free to rotate at the top, such as exterior retaining walls, should be designed using an active lateral soil pressure coefficient of 0.33, with an unsaturated unit weight of soil of 125 pounds per cubic foot.

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The minimum factors of safety for sliding and overturning under static loads should be 1.5 and 2, respectively. Passive pressure at the toe of the walls should not be included as a resisting force when analyzing for overturning and sliding.

CONSTRUCTION RECOMMENDATIONS

Building Subgrade Preparation

Existing utilities, if present, should be removed from within the proposed AST or building footprint, and within an area extending two feet beyond the building footprint. Areas of unstable ground should be over-excavated until the exposed ground is stable and firm. The over-excavated soils should be replaced with compacted granular fill, nominally compacted crushed stone wrapped in filter fabric, or lean concrete (concrete with $f'_c \leq 2,000$ psi).

A geotextile separation or reinforcement fabric overlain by 6 to 12 inches of stone may be required to allow work on subgrade located within the saturated organic silt or organic clay stratum. Saturated, organic soil subgrades can also be protected with a lean concrete “mud mat”.

Fill Material and Compaction

Compacted fill placed below the planned slab-on-grades should consist of clean, granular fill placed on a proof-rolled subgrade. The fill should be compacted to at least 95 percent of its maximum dry density obtained from the Modified Proctor Test (ASTM D1557). The recommended maximum loose lift thickness of fill and minimum number of passes of compaction equipment are provided below.

A minimum thickness of six inches of sand-gravel is required as bedding material for utilities with a diameter of up to one foot, 8 inches for utilities with a diameter of up to three feet, and 12 inches for larger utilities. The maximum grain size should not exceed $1/10$ of the maximum diameter of the utility. A geotextile separation or reinforcement fabric may be required to allow work on utilities placed over the saturated organic soil stratum. The sand-gravel bedding should be nominally compacted with a hand-operated vibratory plate or light roller.

Reuse of In-Situ Soils for Compacted Fill

The Fill stratum and the underlying organic soil stratum have a significant fines content. These soils require substantial moisture conditioning efforts prior to use as compacted fill; therefore, we do not recommend using them as compacted structural fill underneath foundations or adjacent to foundations with sloped excavations. The Fill stratum and the underlying organic soil stratum can be used as fill for non-structural purposes (e.g., earth berms for ornamental purposes or surface water control). In-Situ soils used for non-structural purposes should be moisture conditioned and compacted to at least 92% of the maximum dry density obtained from the Modified Proctor Test (ASTM D1557). We

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restate the difficulties in handling these materials even if they are only used for non-structural purposes given the substantial moisture-conditioning efforts they require.

Temporary Excavation Support

It is not anticipated that temporary excavation support systems will be required. However, if needed, the Owner and the Contractor should be familiar with applicable local, state and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) excavation and trench safety standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our Client. Under no circumstances should the information provided herein be interpreted to mean that GZA is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

If sloped excavations are used, we recommend a slope of less than 1 V : 1.5 H above the water table, and less than 1 V : 2 H below the water table. The Contractor should be aware that slope height, slope inclination, or excavation depth should in no case exceed those specified in local, state, or federal safety regulations such as OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties. Per OSHA requirements, if any excavation is extended to a depth of more than 20 feet, it will be necessary to have the side slopes designed by a Professional Engineer.

The Contractor can also provide temporary vertical excavation support systems ("shoring") as an alternative to temporary sloped excavations. The Contractor or the Contractor's specialty subcontractor would be responsible for the design of the excavation support system in accordance with applicable regulatory requirements, and with the lateral earth pressure recommendations provided in this report. All excavation support systems should be designed by a Professional Engineer.

As a safety measure, we recommend that all vehicles and soil piles be kept a minimum lateral distance from the crest of slopes of no less than one third the slope height. Exposed slope faces should be protected against erosion by the elements.

Subgrade Preparation

Excavate to at least the bottom of the proposed slab-on-grade or pavement section and compact the subgrade with a minimum of 6 passes in each direction of a self-propelled vibratory roller having a drum weight of at least 10,000 pounds and a dynamic force of 20,000 pounds prior to placement of the new slab-on-grade or pavement section.

Sub-base and base courses should be compacted in 1-foot (maximum) lifts to at least 95% of the maximum dry density as determined in accordance with ASTM D-1557 (modified Proctor test). Fill below the sub-base should be compacted to at least 92 percent of the maximum dry density.

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Materials

All fill should be free from ice, snow, roots, sod, rubbish, and other deleterious or organic matter. Gradation requirements for the above-mentioned fills should meet the requirements described below.

Sieve Size	Percent Finer By Weight			
	Sand-Gravel Fill	Granular Fill	¾-Inch Crushed Stone	1½-Inch Crushed Stone
*	100	100	-	-
1½-inch	-	-	-	100
1-inch	-	-	-	85-100
¾-inch	-	-	90-100	10-40
½-inch	50-85	-	10-50	0-8
No. 4	40-75	-	0-5	-
No. 10	30-60	30-95	-	-
No. 40	10-35	10-70	-	-
No. 100	5-20**	-	-	-
No. 200	0-8	0-10	-	<1

* The maximum recommended stone size is 4 inches where used as a base course below slabs; elsewhere, maximum stone sizes should be 2/3 of the loose lift thickness.

** The amount passing the No. 100 sieve should be between forty percent (40%) and seventy percent (70%) of that amount passing the No. 40 sieve.

Placement and Compaction

The recommended minimum compaction for fill and backfill beneath footings and foundations is 95 percent of the maximum dry density as determined by ASTM D1557 (modified Proctor density). Guidance for lift thickness versus compaction equipment is provided below. Lift thicknesses should be adjusted as required in order to achieve the minimum compaction requirements.

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Compaction Method	Maximum Stone Size	Maximum Loose Lift Thickness		Minimum Number of Passes	
		Below Structures and Pavement	Less Critical Areas	Below Structures and Pavement	Less Critical Areas
Hand-operated vibratory plate or light roller in confined areas	3"	6"	8"	6	4
Hand-operated vibratory drum rollers weighing at least 1,000# in confined areas	6"	8"	10"	6	4
Light vibratory drum roller, minimum dynamic force 3,000# per foot of drum width	6"	10"	14"	6	4
Medium to heavy vibratory drum roller, minimum dynamic force 5,000-8,000# per foot drum width	8"	12"	18"	6	4

The Contractor should reduce or stop drum vibration if pumping or weaving of the subgrade is observed.

Quality Assurance and Control

We recommend that an engineer knowledgeable in soils and foundations and the requirements of the IBCNJ be retained to inspect, verify, and approve earthworks, subgrades, and underpinning. This includes the review of plans prior to bidding and site-inspection at the time of construction. Such work is intended to reduce unexpected circumstances throughout the bidding and construction process. Site inspections are intended to document and verify that the contractor's plans are implemented as designed and approved. This includes verifying that the appropriate bearing stratum has been reached, that the subgrade has been properly prepared for foundation construction, and that foundation piles have been installed per design requirements and in the manner proposed.



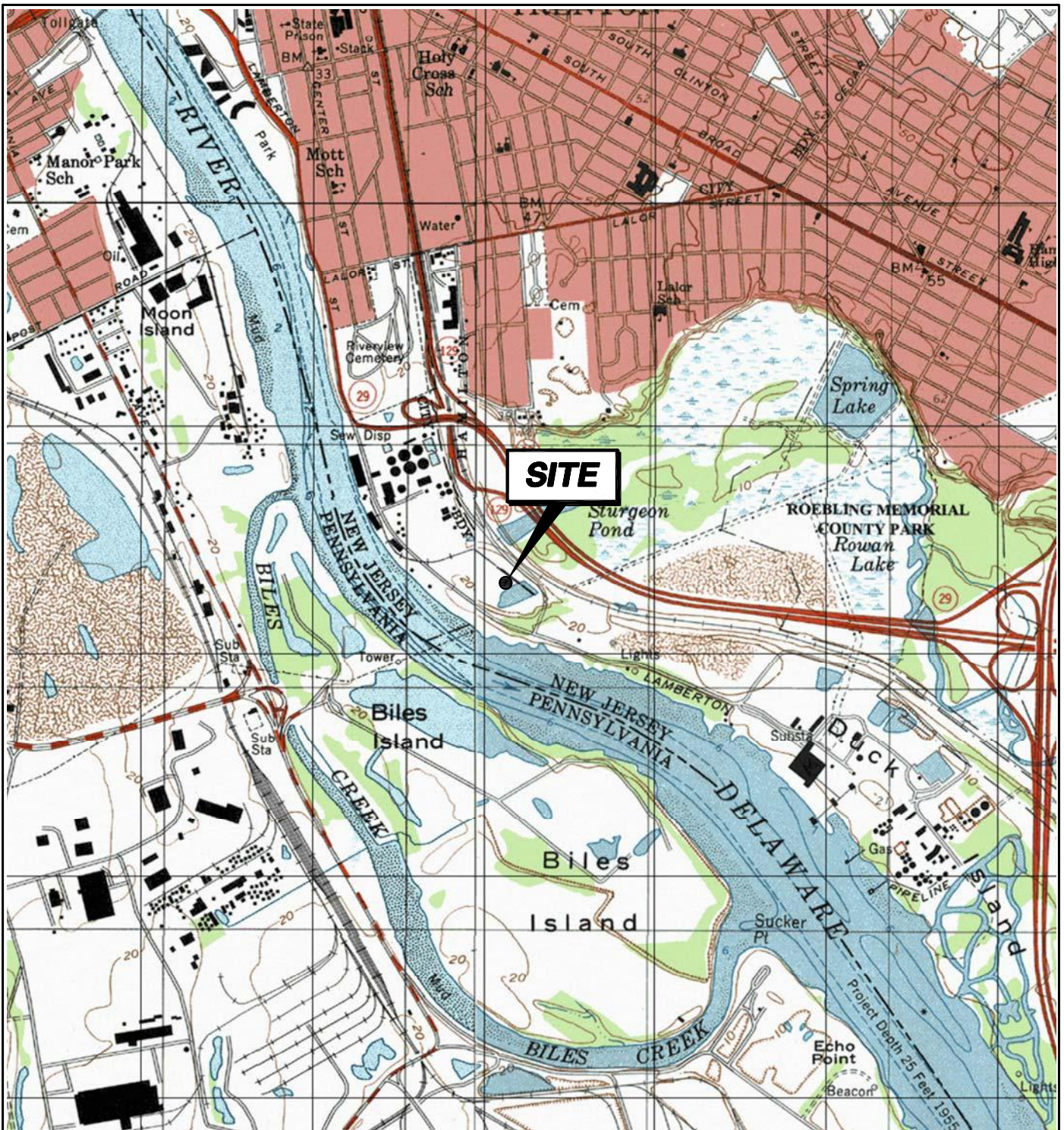
Kelly
Brumbaugh

[Signature]
Marc Hudock
S

Erne Ha *[Signature]*

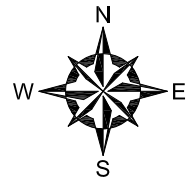


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QUADRANGLE LOCATION

SOURCE:
USGS TOPOGRAPHIC MAPS: TRENTON EAST, NJ (1995) &
TRENTON WEST, NJ-PA (1995). CONTOUR INTERVAL 10 FT.,
ORIGINAL SCALE 1:24,000 (1" = 2,000 FT.)



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TRENTON BIOGAS
1600 LAMBERTON ROAD
TRENTON, NEW JERSEY

PREPARED BY:



GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

TRENTON BIOGAS

PROJ MGR: MH

REVIEWED BY: MH

CHECKED BY: VB

FIGURE

DESIGNED BY: VB

DRAWN BY: EM

SCALE: 1" = 200'

1

DATE:

PROJECT NO.

REVISION NO.

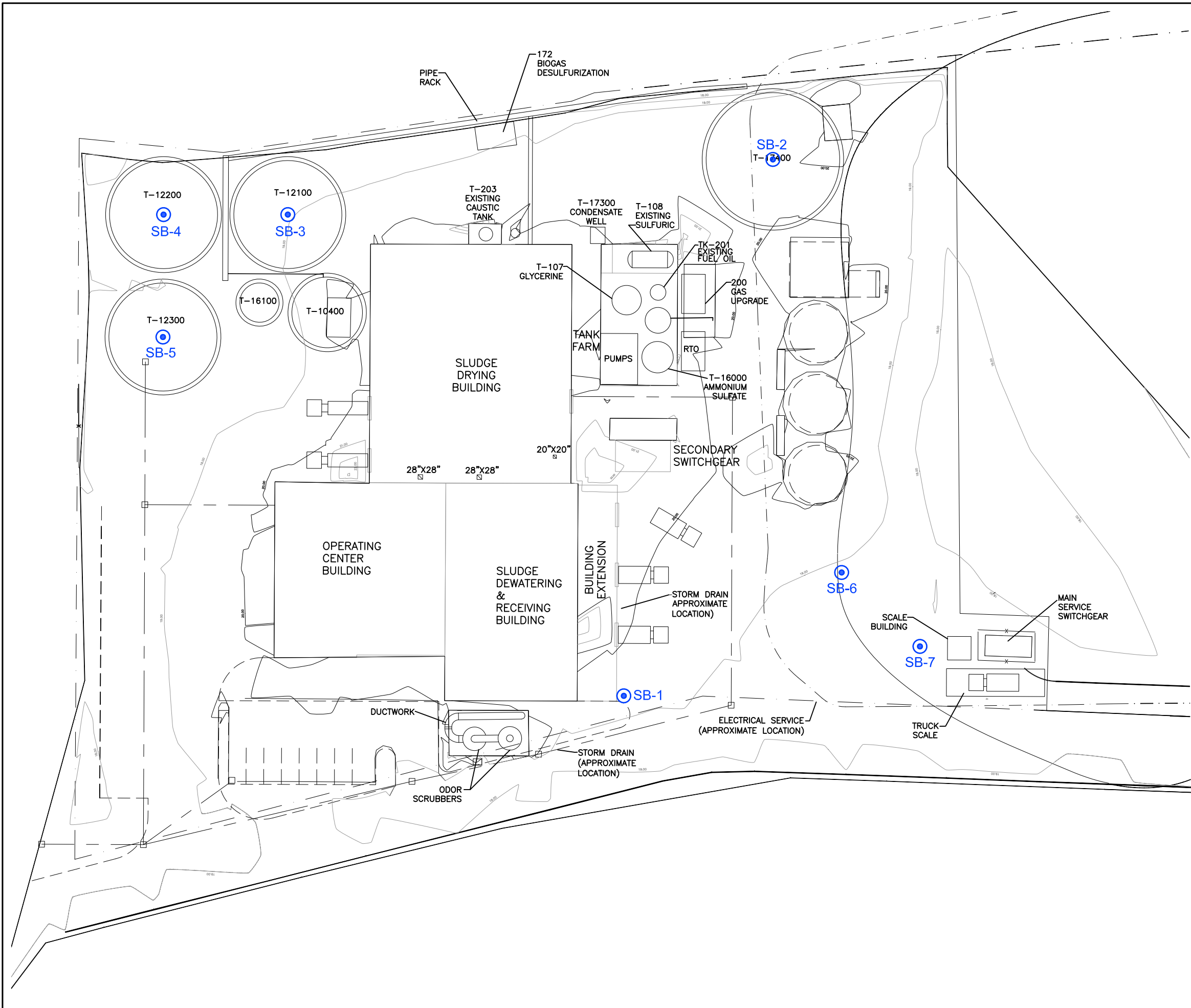
SHEET NO.

MAY 2013

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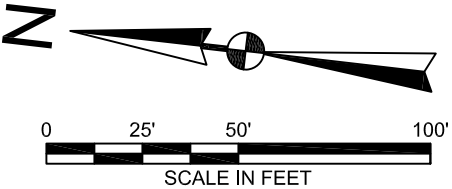
SITE LOCATION PLAN


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LEGEND:
SOIL BORING LOCATION

NOTES:
1) BASE MAP DEVELOPED FROM PLAN PROVIDED BY AMEC, ENTITLED "TRENTON BIOGAS SITE PLAN," DATED 4/18/13, ORIGINAL SCALE 1" = 30', DRAWING No.WKS-1.
2) THE LOCATION OF THE BORINGS WERE APPROXIMATELY DETERMINED BY TAPE MEASUREMENTS FROM EXISTING TOPOGRAPHIC FEATURES. THESE DATA SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.



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EXPLORATION LOCATION PLAN			
PREPARED BY:  GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: TRENTON BIOGAS	
PROJ MGR: MH	REVIEWED BY: MH	CHECKED BY: VB	FIGURE 2 SHEET NO.
DESIGNED BY: VB	DRAWN BY: EM	SCALE: 1" = 50'	
DATE: MAY 2013	PROJECT NO. 12.0076146.00	REVISION NO.	

ATTACHMENT A
LIMITATIONS



GEOTECHNICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

4. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.
5. In preparing this report, GZA relied on certain information provided by the Client referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.
6. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

7. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.
8. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

9. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Additional Services

10. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

ATTACHMENT B
TEST BORING LOGS

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
Trenton BioGas
1600 Lambertson Road
1600 Lambertson Road Trenton NJ

EXPLORATION NO.: SB-1
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY:

Logged By: V. Brumbaugh
Drilling Co.: Craig Test Boring
Foreman: Tom Ward

Type of Rig: Track Rig
Rig Model: CME
Drilling Method: Mud Rotary

Boring Location: See Plan
Ground Surface Elev. (ft.):
Final Boring Depth (ft.): 32
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum:
V. Datum:

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size:

Groundwater Depth (ft.)


Date	Time	Water Depth	Stab. Time
5/16/13	14:30	15	

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0-2	24	12	5 6 11 13	17	S-1 : Medium dense dark olive gray medium SAND, some Silt and Gravel, moist (FILL).					
		S-2a	2-2.5	24	22	26 19	33	S-2a : Upper 6 in.: Medium dense light gray course GRAVEL.					
		S-2	2.5-4			14 14		S-2 : Bottom 16 in.: Medium dense olive brown SAND, some Silt and Gravel, moist.					
		S-3	4-5	24	24	9 10 10 8	20	S-3 : Upper 12 in.: Medium dense light gray GRAVEL, moist.					
		S-4	6-8	24	10	4 8 16 18	24	: Bottom 12 in.: Medium dense olive brown SILT, some Sand, little gravel, moist.					
		S-5a	8-8.3	24	18	4 10	18	S-4 : Medium dense black medium to course SAND, some Silt, trace miscellaneous fill, moist.			8.3		
		S-5	8.3-10			8 6		S-5a : Upper 4 in.: Medium dense light orange and black FILL materials, chipped stone.			10	SAND	
		S-6	10-12	24	19	4 4 4 8	8	S-5 : Bottom 14 in.: Medium dense tan and light gray medium to course SAND, moist.			12	SAND	
								S-6 : Loose light brown F-M SAND, trace Silt, moist.					
		S-7	15-17	24	5	12 8 4 4	12	S-7 : Medium dense dark gray course SAND, some Gravel, moist to wet.			17	SAND	
20		S-8	20-22	24	0	17 10 18 14	28	S-8 : No recovery.			22		
		S-9	25-27	24	8	29 34 40 37	74	S-9 : Very dense mottled reddish brown and yellow brown GRAVEL, some course Sand, wet.			27	GRAVEL	

REMARKS

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-1

TEST BORING LOG													
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>				Trenton BioGas, LLC Trenton BioGas 1600 Lambertson Road 1600 Lambertson Road Trenton NJ				EXPLORATION NO.: SB-1 SHEET: 2 of 2 PROJECT NO: 12.0076146.00 REVIEWED BY:					
Logged By: V. Brumbaugh Drilling Co.: Craig Test Boring Foreman: Tom Ward				Type of Rig: Track Rig Rig Model: CME Drilling Method: Mud Rotary		Boring Location: See Plan Ground Surface Elev. (ft.): Final Boring Depth (ft.): 32 Date Start - Finish: 5/16/2013 - 5/16/2013				H. Datum: V. Datum:			
Hammer Type: Automatic Hammer Hammer Weight (lb.): 140 Hammer Fall (in.): 30 Auger or Casing O.D./I.D Dia (in.): 4.25/4.0				Sampler Type: SS Sampler O.D. (in.): 2.0 Sampler Length (in.): 24 Rock Core Size:			Groundwater Depth (ft.)						
							Date	Time	Water Depth	Stab. Time			
							5/16/13	14:30	15				
Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-10	30-32	24	6	14 20 18 16	38	S-10 : Dense mottled GRAVEL, some coarse Sand, wet.				GRAVEL	
								End of exploration at 32 feet.			32		
35													
40													
45													
50													
55													
60													
REMARKS													
See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.											Exploration No.: SB-1		

GZA TEMPLATE TEST BORING; 7/1/2013; 5:06:30 PM


GZA
GeoEnvironmental, Inc.
Engineers and Scientists

EXPLORATION NO.: SB-2
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY:

H. Datum:
V. Datum:

Date	Time	Water Depth	Stab. Time
5/15/13	11:00	14	

GZA TEMPLATE TEST BORING; 7/1/2013; 5:06:32 PM

TEST BORING LOG																									
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>				Trenton BioGas, LLC Trenton BioGas 1600 Lambertson Road 1600 Lambertson Road Trenton NJ				EXPLORATION NO.: SB-2 SHEET: 2 of 2 PROJECT NO: 12.0076146.00 REVIEWED BY:																	
Logged By: V. Brumbaugh Drilling Co.: Craig Test Boring Foreman: Tom Ward				Type of Rig: Track Rig Rig Model: CME Drilling Method: Mud Rotary		Boring Location: See Plan Ground Surface Elev. (ft.): Final Boring Depth (ft.): 32 Date Start - Finish: 5/15/2013 - 5/15/2013				H. Datum: V. Datum:															
Hammer Type: Automatic Hammer Hammer Weight (lb.): 140 Hammer Fall (in.): 30 Auger or Casing O.D./I.D Dia (in.): 4.25/4.0				Sampler Type: SS Sampler O.D. (in.): 2.0 Sampler Length (in.): 24 Rock Core Size:				<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4" style="text-align: center;">Groundwater Depth (ft.)</th> </tr> <tr> <th style="width: 25%;">Date</th> <th style="width: 25%;">Time</th> <th style="width: 25%;">Water Depth</th> <th style="width: 25%;">Stab. Time</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">5/15/13</td> <td style="text-align: center;">11:00</td> <td style="text-align: center;">14</td> <td></td> </tr> </tbody> </table>						Groundwater Depth (ft.)				Date	Time	Water Depth	Stab. Time	5/15/13	11:00	14	
Groundwater Depth (ft.)																									
Date	Time	Water Depth	Stab. Time																						
5/15/13	11:00	14																							
Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)												
		S-10	30-32	24	12	21 38 32 19	70	S-10 : Very dense yellowish brown course GRAVEL, some course Sand, wet.			32	GRAVEL													
								End of exploration at 32 feet.																	
35																									
40																									
45																									
50																									
55																									
60																									
REMARKS																									
See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.												Exploration No.: SB-2													

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

EXPLORATION NO.: SB-3
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY:


H. Datum:
V. Datum:


Date	Time	Water Depth	Stab. Time
5/16/13	08:30	15	


GZA TEMPLATE TEST BORING; 7/1/2013; 5:06:34 PM

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Page 29 of 58

TEST BORING LOG														
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>				Trenton BioGas, LLC Trenton BioGas 1600 Lambertson Road 1600 Lambertson Road Trenton NJ				EXPLORATION NO.: SB-3 SHEET: 2 of 2 PROJECT NO: 12.0076146.00 REVIEWED BY:						
Logged By: V. Brumbaugh Drilling Co.: Craig Test Boring Foreman: Tom Ward				Type of Rig: Track Rig Rig Model: CME Drilling Method: Mud Rotary		Boring Location: See Plan Ground Surface Elev. (ft.): Final Boring Depth (ft.): 32 Date Start - Finish: 5/16/2013 - 5/16/2013				H. Datum: V. Datum:				
Hammer Type: Automatic Hammer Hammer Weight (lb.): 140 Hammer Fall (in.): 30 Auger or Casing O.D./I.D Dia (in.): 4.25/4.0				Sampler Type: SS Sampler O.D. (in.): 2.0 Sampler Length (in.): 24 Rock Core Size:			Groundwater Depth (ft.)							
							Date		Time		Water Depth		Stab. Time	
							5/16/13		08:30		15			
Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)	
		S-10	30-32	24	6	16 18 13 16	31	S-10 : Dense reddish brown coarse GRAVEL.				GRAVEL		
								End of exploration at 32 feet.			32			
35														
40														
45														
50														
55														
60														
REMARKS														
See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.												Exploration No.: SB-3		

TEST BORING LOG															
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>				Trenton BioGas, LLC Trenton BioGas 1600 Lambertson Road 1600 Lambertson Road Trenton NJ				EXPLORATION NO.: SB-4 SHEET: 1 of 2 PROJECT NO: 12.0076146.00 REVIEWED BY:							
				Logged By: V. Brumbaugh Drilling Co.: Craig Test Boring Foreman: Tom Ward				Type of Rig: Track Rig Rig Model: CME Drilling Method: Mud Rotary		Boring Location: See Plan Ground Surface Elev. (ft.): Final Boring Depth (ft.): 32 Date Start - Finish: 5/15/2013 - 5/15/2013				H. Datum: V. Datum:	
Hammer Type: Automatic Hammer Hammer Weight (lb.): 140 Hammer Fall (in.): 30 Auger or Casing O.D./I.D Dia (in.): 4.25/4.0				Sampler Type: SS Sampler O.D. (in.): 2.0 Sampler Length (in.): 24 Rock Core Size:				Groundwater Depth (ft.)							
								Date		Time		Water Depth		Stab. Time	
								5/15/13		14:30		20			
Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)		
5		S-1	0-0.5 0.5-2	18	18	5 3 3	8	: Drilled through Asphalt. S-1 : Loose black fine to medium SAND, some coarse Gravel, moist (FILL).			0.5	ASPHALT			
		S-2a	2-3	23	16	5 4 8 50/5"	12	S-2a : Concrete and miscellaneous FILL. S-2b : Medium dense black silty fine SAND, moist.				FILL			
		S-2b	3-4												
		S-3	4-5	2	2	60/1"	R	S-3 : Concrete, Fill.							
		S-3a	5-6	10	10	20 50/4"	R	S-3a : Very dense black silty SAND, slightly cohesive, some coarse Gravel, wet.							
		S-4	6-7 7-8	24	24	10 9 10 14	19	S-4 : Upper 12 in.: Medium dense black course GRAVEL. : Bottom 12 in.: Medium dense olive brown SILT and fine to medium Sand.			7 8	SILT			
		S-5a	8-8.3	24	8	12 10	14	S-5a : Upper 4 in.: Medium dense gray medium silty SAND, moist.			8.3	SILTY SAND			
		S-5b	8.3-10			4 2		S-5b : Bottom 4 in.: Medium stiff soft black organic CLAY, moist.			10	CLAY			
		S-6	10-12	24	0	2 2 2 3	4	S-6 : No recovery in Shelby tube or subsequent Split spoon sample attempt.			12				
		S-7	15-17	24	16	2 5 5 7	10	S-7 : Stiff black oraginic CLAY, low plasticity, moist. Moderate odor noted.			17	CLAY			
20		S-8	20-22	24	8	5 2 3 3	5	S-8 : Loose dark brownish black SILT & CLAY, low plasticity, saturated.			22	CLAYEY SILT			
		S-9	25-27	24	6	10 14 21 30	35	S-9 : Dense reddish yellow mottled course SAND, and Gravel, moist.			27	SAND AND GRAVEL			
25															
30															
REMARKS															
See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.												Exploration No.: SB-4			

TEST BORING LOG													
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>				Trenton BioGas, LLC Trenton BioGas 1600 Lambertson Road 1600 Lambertson Road Trenton NJ				EXPLORATION NO.: SB-4 SHEET: 2 of 2 PROJECT NO: 12.0076146.00 REVIEWED BY:					
Logged By: V. Brumbaugh Drilling Co.: Craig Test Boring Foreman: Tom Ward				Type of Rig: Track Rig Rig Model: CME Drilling Method: Mud Rotary		Boring Location: See Plan Ground Surface Elev. (ft.): Final Boring Depth (ft.): 32 Date Start - Finish: 5/15/2013 - 5/15/2013				H. Datum: V. Datum:			
Hammer Type: Automatic Hammer Hammer Weight (lb.): 140 Hammer Fall (in.): 30 Auger or Casing O.D./I.D Dia (in.): 4.25/4.0				Sampler Type: SS Sampler O.D. (in.): 2.0 Sampler Length (in.): 24 Rock Core Size:			Groundwater Depth (ft.)						
							Date	Time	Water Depth	Stab. Time			
							5/15/13	14:30	20				
Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-10	30-32	24	14	8 28 15 15	43	S-10 : Hard light gray CLAY & SILT, medium plasticity, with yellow fine Sand stringers, wet.				CLAY	
								End of exploration at 32 feet.			32		
35													
40													
45													
50													
55													
60													
REMARKS													
See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.												Exploration No.: SB-4	



EXPLORATION NO.: SB-5
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY:

H. Datum:
V. Datum:

Date	Time	Water Depth	Stab. Time
5/16/13	08:30	15	

REMARKS

Exploration No.:
SB-5

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

**Trenton BioGas, LLC
Trenton BioGas
1600 Lambertson Road
1600 Lambertson Road Trenton NJ**

EXPLORATION NO.: SB-5
SHEET: 2 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY:

Logged By: V. Brumbaugh
Drilling Co.: Craig Test Boring
Foreman: Tom Ward

Type of Rig: Track Rig
Rig Model: CME
Drilling Method: Mud Rotar

Boring Location: See Plan
Ground Surface Elev. (ft.):
Final Boring Depth (ft.): 47
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum:
V. Datum:

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size:

Groundwater Depth (ft.)

Date	Time	Water Depth	Stab. Time
5/16/13	08:30	15	

[illegible]

REMARKS

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-5

GZA
GeoEnvironmental, Inc.
Engineers and Scientists

EXPLORATION NO.: SB-6
SHEET: 1 of 1
PROJECT NO: 12.0076146.00
REVIEWED BY:

H. Datum:
V. Datum:

Date	Time	Water Depth	Stab. Time
5/17/13	08:30	15	

GZA TEMPLATE TEST BORING; 7/1/2013; 5:06:39 PM

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

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GZA
GeoEnvironmental, Inc.
Engineers and Scientists

EXPLORATION NO.: SB-7
SHEET: 1 of 1
PROJECT NO: 12.0076146.00
REVIEWED BY:

H. Datum:
V. Datum:

Date	Time	Water Depth	Stab. Time
5/17/13	09:30	15	

GZA TEMPLATE TEST BORING; 7/1/2013; 5:06:40 PM

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Page 36 of 58

ATTACHMENT C
LABORATORY TEST REPORTS

LABORATORY TESTING DATA SHEET



Project Name Trenton BioGas
 Project No. 12.0076146.00
 Project Manager Marc Huddock

Location Trenton, NJ
 Assigned By Victoria Brumbaugh
 Report Date 5/29/2013

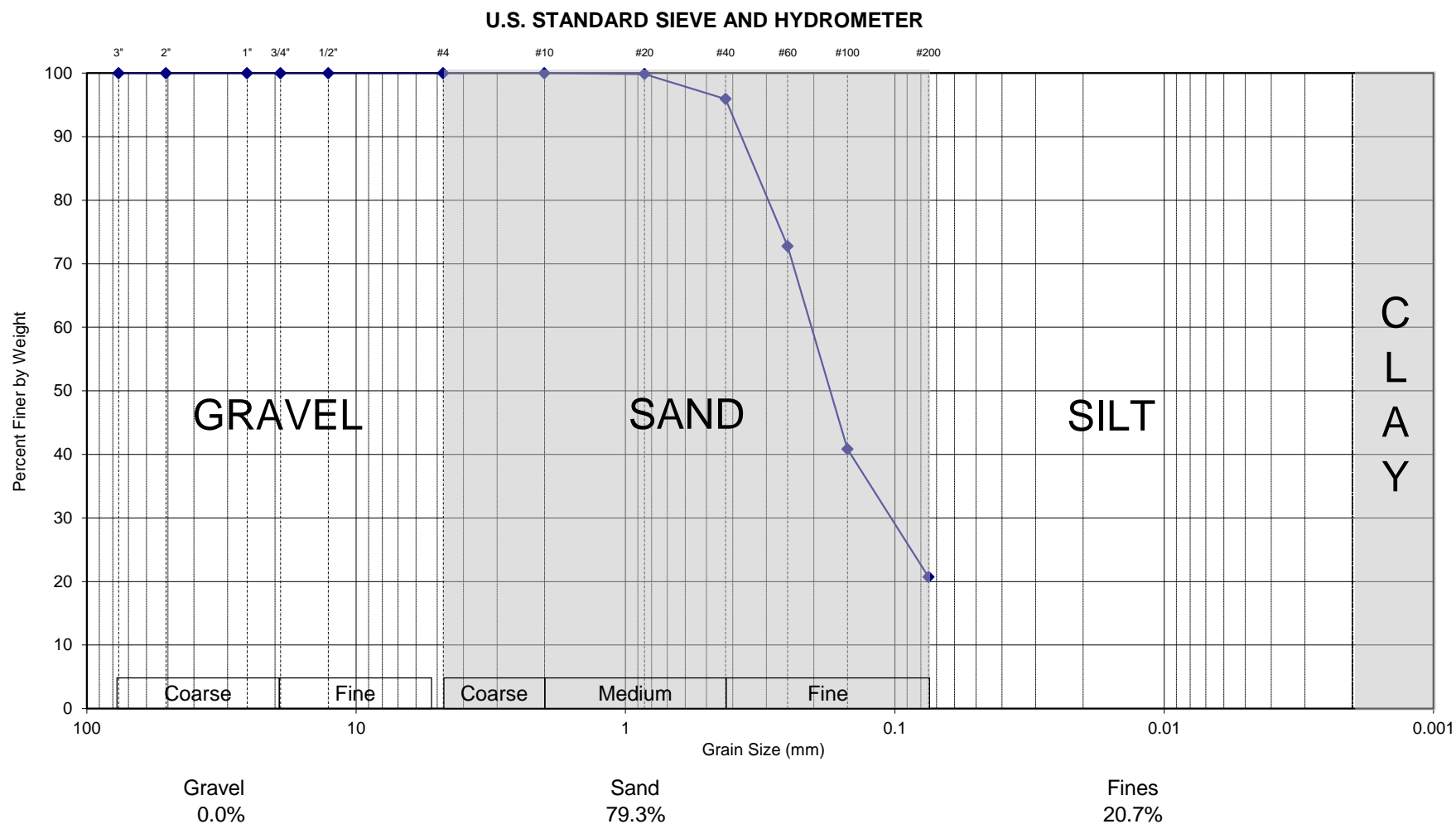
Reviewed By _____
 Date Reviewed 5/29/2013

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2 μ %	ORG %	G _s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	
SB-2	S-8	20-22	1				20.7											Dark brown fine SAND, some Silt
SB-3	S-6	10-12	2	97.6	98	53												
SB-3	S-8	20-22	3				33.8											Dark brown fine SAND, some Silt
SB-4	S-8	20-22	4	34.9	28	21												
SB-4	S-10	30-32	5	24.0	31	19												
SB-6	S-3	4-6	6	111.3	98	54	86.2											Brown Organic SILT, little fine Sand
SB-6	S-7	20-22	7				4.8											Brown f-c GRAVEL, some f-c Sand, trace Silt
SB-7	S-7	20-22	8				17.1											Brown f-m SAND, little Silt
SB-1	S-6	10-12	9				9.2											Light brown fine SAND, trace Silt



195 Frances Avenue
 Cranston, RI 02910

401-467-6454



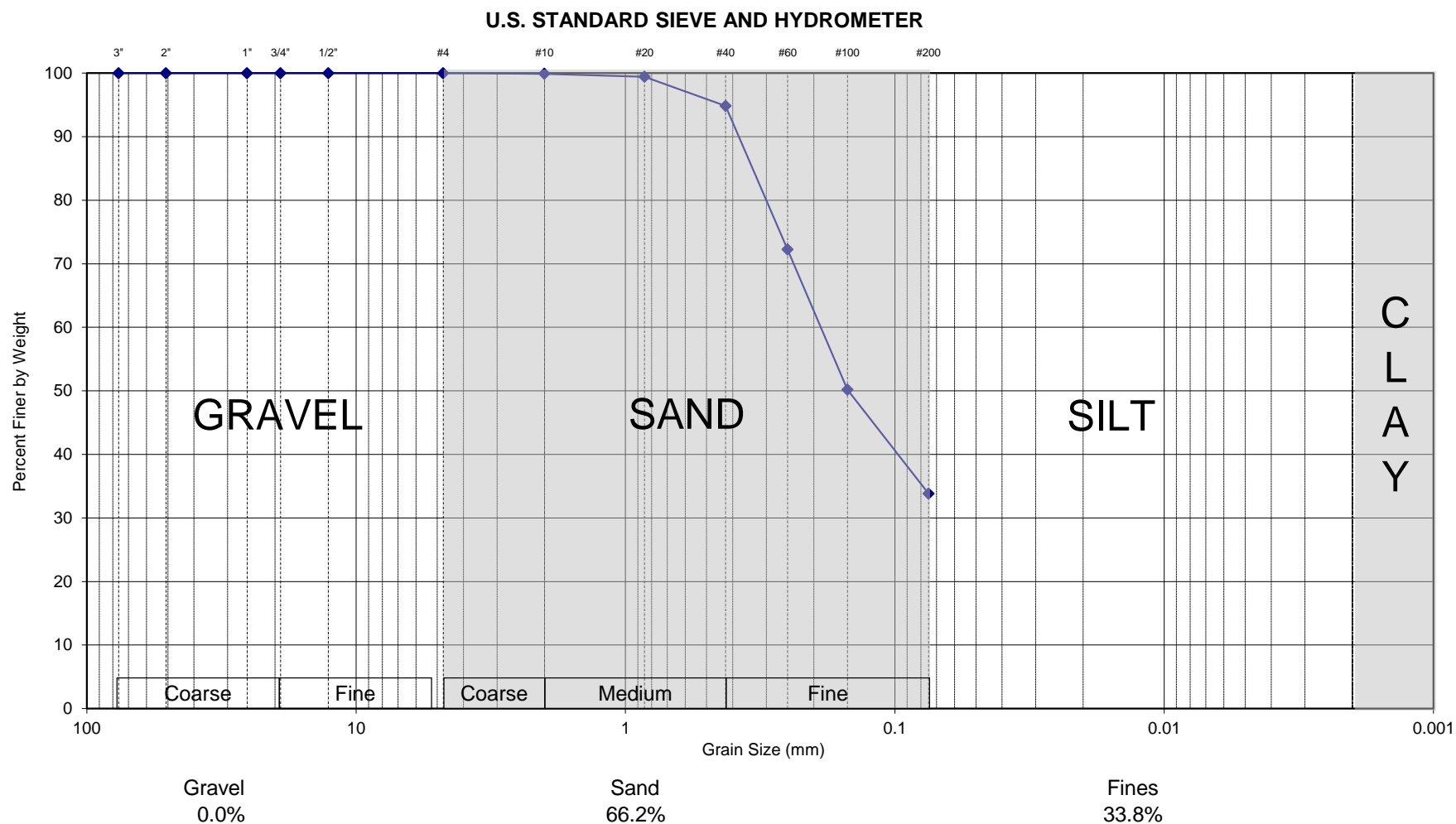
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
1	SB-2	S-8	20-22'	Dark brown fine SAND, some Silt				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	95.9
#60	72.8
#100	40.8
#200	20.7

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



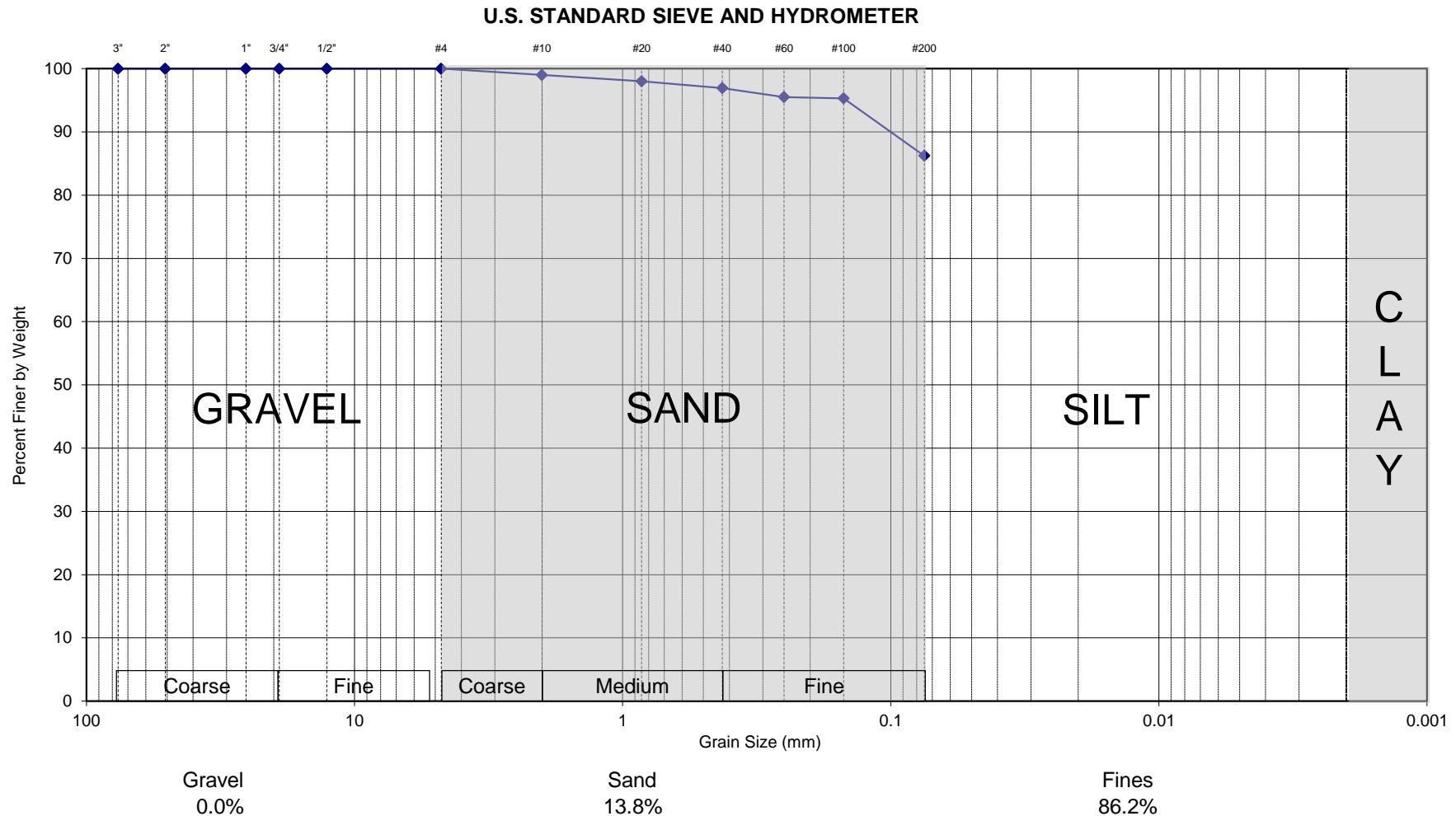
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
3	SB-3	S-8	20-22'	Dark brown fine SAND, some Silt				

Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	99.9
#20	99.4
#40	94.8
#60	72.2
#100	50.2
#200	33.8

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



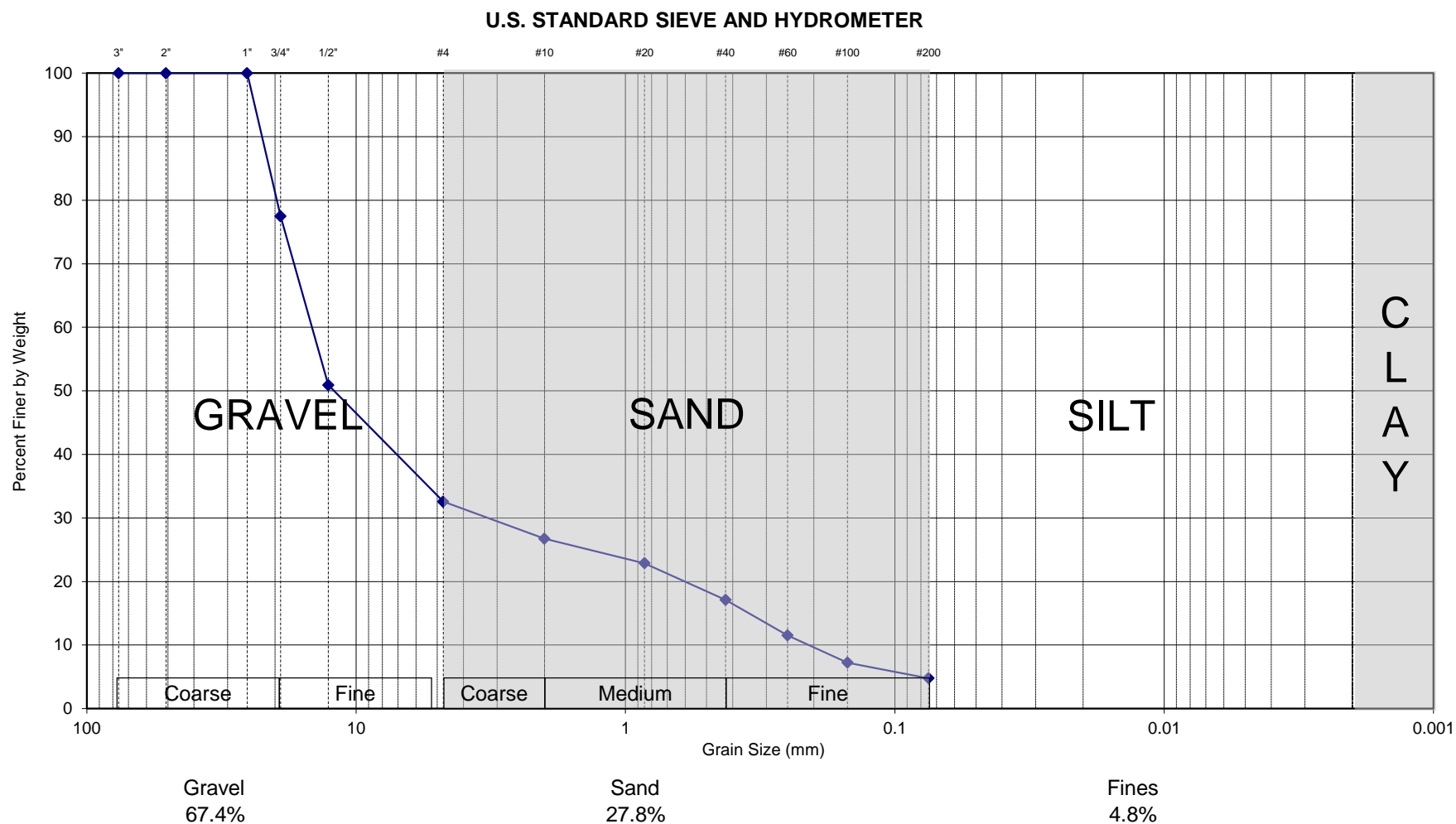
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
6	SB-6	S-3	4-6'	Brown Organic SILT, little fine Sand	111.3	98	54	44

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.0
#20	98.0
#40	96.9
#60	95.5
#100	95.3
#200	86.2

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



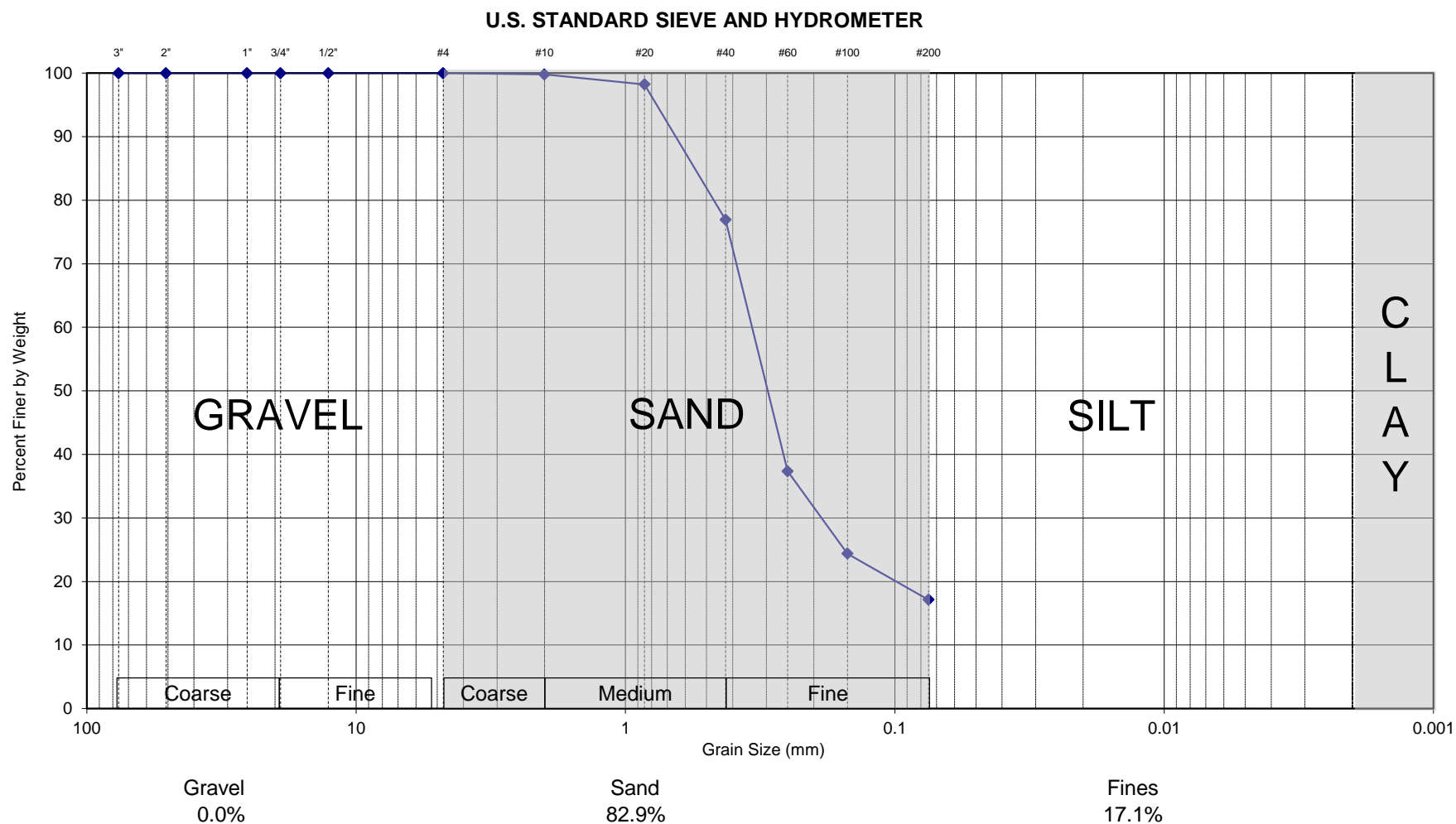
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
7	SB-6	S-7	20-22'	Brown f-c GRAVEL, some f-c Sand, trace Silt				

Sieve Size	% Passing
3/4"	77.5
1/2"	50.9
#4	32.6
#10	26.7
#20	22.9
#40	17.1
#60	11.5
#100	7.2
#200	4.8

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



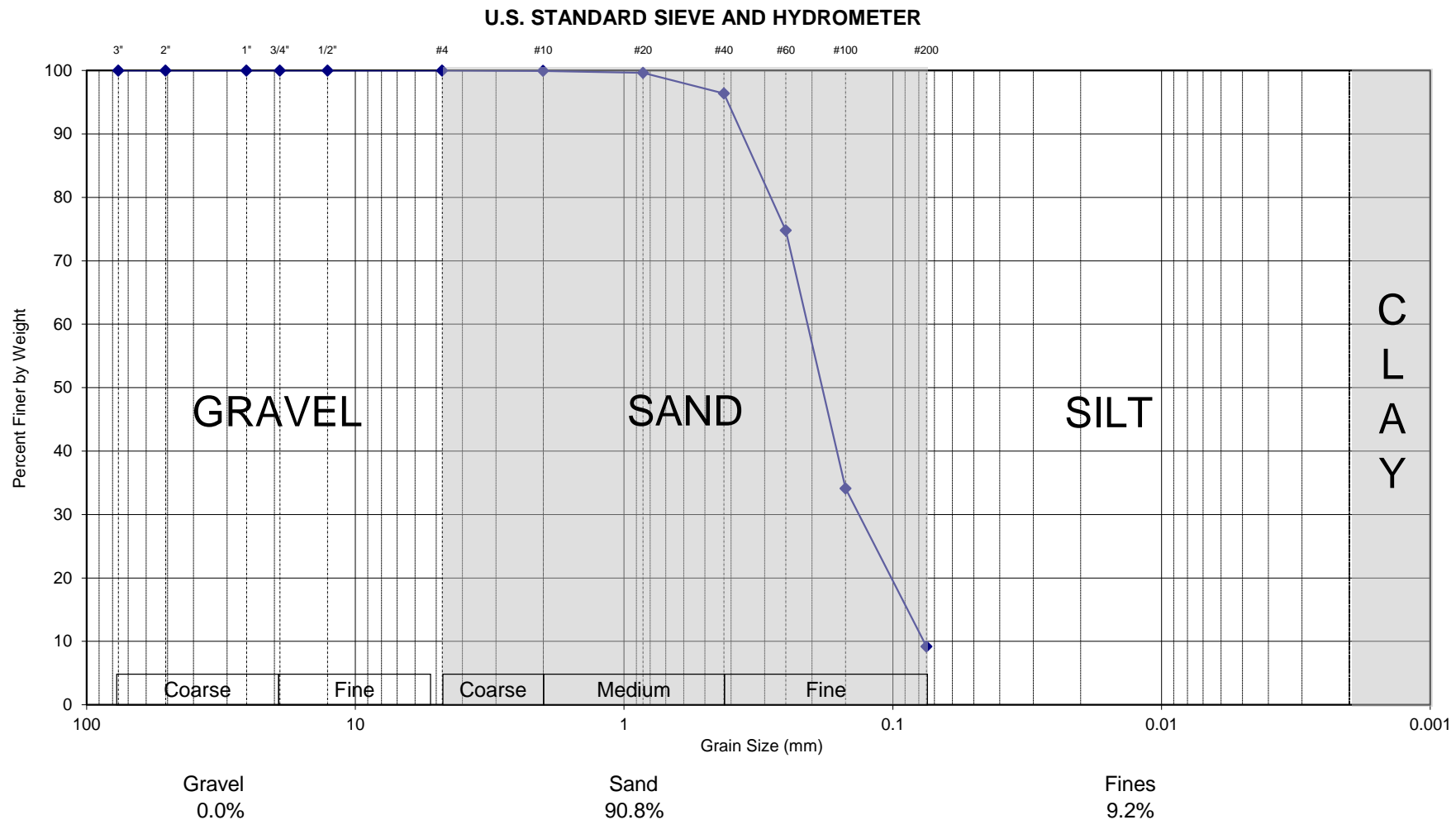
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
8	SB-7	S-7	20-22'	Brown f-m SAND, little Silt				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.8
#20	98.2
#40	76.9
#60	37.4
#100	24.4
#200	17.1

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
9	SB-1	S-6	10-12'	Light brown fine SAND, trace Silt				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.6
#40	96.4
#60	74.8
#100	34.1
#200	9.2

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

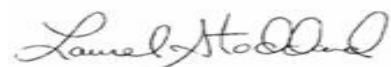
Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13

CERTIFICATE OF ANALYSIS

Victoria Brumbaugh
GZA GeoEnvironmental, Inc.
501 Office Center Drive, Suite 220
Ft. Washington, PA 19034

RE: Trenton BioGas (12.0076146.00)
ESS Laboratory Work Order Number: 1305599

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.



Laurel Stoddard
Laboratory Director

REVIEWED*By ESS Laboratory at 11:49 am, Jun 07, 2013***Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

SAMPLE RECEIPT

The following samples were received on May 31, 2013 for the analyses specified on the enclosed Chain of Custody Record.

Client did not deliver samples in a cooler.

Lab Number	SampleName	Matrix	Analysis
1305599-01	SB-1 S-1 0-2ft	Soil	9038, 9045, 9250
1305599-02	SB-2 S-1 0-2ft	Soil	9038, 9045, 9250
1305599-03	SB-3 S-2 2-4ft	Soil	9038, 9045, 9250
1305599-04	SB-4 S-2a 2-4ft	Soil	9038, 9045, 9250
1305599-05	SB-6 S-2 2-4ft	Soil	9038, 9045, 9250



ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory

*The Microbiology Division
of Thielsch Engineering, Inc.*



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

[Definitions of Quality Control Parameters](#)
[Semivolatile Organics Internal Standard Information](#)
[Semivolatile Organics Surrogate Information](#)
[Volatile Organics Internal Standard Information](#)
[Volatile Organics Surrogate Information](#)
[EPH and VPH Alkane Lists](#)



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5035 - Solid Purge and Trap



ESS Laboratory
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BAL Laboratory

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of Thielsch Engineering, Inc.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-1 S-1 0-2ft
Date Sampled: 05/16/13 00:00
Percent Solids: 86

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-01
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (35)		9250		1	EEM	06/04/13 12:52	mg/kg dry	CF30426
Corrosivity (pH)	6.41 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.1 °C.								
Sulfate	WL 313 (58)		9038		1	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-2 S-1 0-2ft
Date Sampled: 05/15/13 00:00
Percent Solids: 88

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-02
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (34)		9250		1	EEM	06/04/13 12:54	mg/kg dry	CF30426
Corrosivity (pH)	7.04 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.0 °C.								
Sulfate	WL 66 (56)		9038		1	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-3 S-2 2-4ft
Date Sampled: 05/16/13 00:00
Percent Solids: 86

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-03
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (35)		9250		1	EEM	06/04/13 12:54	mg/kg dry	CF30426
Corrosivity (pH)	6.93 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.1 °C.								
Sulfate	WL 598 (116)		9038		2	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-4 S-2a 2-4ft
Date Sampled: 05/15/13 00:00
Percent Solids: 81

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-04
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL 101 (37)		9250		1	EEM	06/04/13 12:55	mg/kg dry	CF30426
Corrosivity (pH)	10.4 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 21.9 °C.								
Sulfate	WL 713 (122)		9038		2	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-6 S-2 2-4ft
Date Sampled: 05/17/13 00:00
Percent Solids: 75

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-05
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (40)		9250		1	EEM	06/04/13 12:56	mg/kg dry	CF30426
Corrosivity (pH)	7.58 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.2 °C.								
Sulfate	WL 358 (66)		9038		1	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Classical Chemistry

Batch CE33130 - General Preparation

Blank

Sulfate	ND	5	mg/kg wet
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LCS

Sulfate	9		mg/L	9.988	95	80-120
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Batch CF30426 - General Preparation

Blank

Chloride	ND	3	mg/kg wet
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LCS

Chloride	32		mg/L	30.00	107	90-110
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CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

Notes and Definitions

Z-10c	Soil pH measured in water at 22.2 °C.
Z-10b	Soil pH measured in water at 22.1 °C.
Z-10a	Soil pH measured in water at 22.0 °C.
Z-10	Soil pH measured in water at 21.9 °C.
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)

A2LA Accredited: Testing Cert# 2864.01

<http://www.a2la.org/scopepdf/2864-01.pdf>

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/labs/waterlabs-instate.php>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutOfStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002

http://www.maine.gov/dep/blwq/topic/vessel/lab_list.pdf

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/labcert/labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://www4.egov.nh.gov/des/nhelap/namesearch.asp>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

http://datamine2.state.nj.us/dep/DEP_OPRA/

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301

http://www.mde.state.md.us/assets/document/WSP_labs-2009apr20.pdf

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

Lead Paint, Lead in Children's Metals Jewelry

<http://www.cpsc.gov/cgi-bin/labapplist.aspx>

EXHIBIT B



Proactive by Design

GEOTECHNICAL

ENVIRONMENTAL

ECOLOGICAL

WATER

CONSTRUCTION
MANAGEMENT

55 Lane Road
Suite 407
Fairfield, NJ 07004
T: 973-774-3300
F: 973-774-3350
www.gza.com

January 5, 2018
File No. 12.0076146.20

Mr. Peter Joseph
Trenton Biogas LLC
156 West 56th St.
Suite 1203
New York, NY 10019

Re: Geotechnical Engineering Evaluation Report (Revision 2)
Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ 08611

Dear Peter:

GZA GeoEnvironmental, Inc. (GZA) is pleased to provide you with this updated geotechnical report for the above-referenced facility. The objective of our geotechnical services is to provide foundation design and related earthwork recommendations for your planned construction. Our June 29, 2016 report was updated to incorporate the results of the more recent subsurface exploration program performed in November 2017, as further described below. The recommendations in this report are subject to the Limitations provided in Attachment A and our Terms and Conditions of Engagement.

BACKGROUND

The project is located at 1600 Lamberton Road in Trenton, Mercer County, New Jersey. Figure 1 presents the approximate location of the Site. The Site is greater than 3-acres in size and contains several existing structures, including a former operating center building, a sludge dewatering & receiving building, a sludge drying building, scrubbers, an existing tank farm and electrical service switchgear.

Based on a review of the 2011 Trenton East, NJ-PA, 7.5-minute quadrangle topographic map, prepared by the U.S. Geological Survey (USGS), the Site is situated in an industrial setting surrounded by the urban area of Trenton at an elevation of approximately 20 feet above mean sea level (AMSL). The ground surface at the Site was observed to be generally flat. Regionally, the land is also generally flat with ground surface elevations between about 10 and 20 feet AMSL. A few small gently sloping hills are present approximately 4,000+ feet to the north-northeast and northwest that rise to about 40 feet AMSL.

The proposed construction consists of three, 1.3 million-gallon, above ground storage tanks (ASTs) and a smaller 450,000-gallon buffer AST in the northeastern corner of the Site; plus, a smaller equipment slab-on-grade, truck parking and a truck freight scale. Based on discussions with Amec (now Wood), each of the larger ASTs is approximately



56 feet in diameter and about 70 feet in height, supported on a 3-foot thick reinforced concrete slab-on-grade. The anticipated allowable soil bearing required is about 4,600 pounds per square foot (psf) for static loading and about 7,700 psf for dynamic loading at the larger ASTs and up to 1,000 psf for the smaller structures. We assume a settlement of up to 1 to 2-inches is acceptable for the ASTs and less than 1-inch is acceptable for building structures. Also, a nominal differential settlement of ½-inch or less is considered tolerable at the various structures.

REGIONAL GEOLOGY

The Site is located in the physiogeologic province of the New Jersey Coastal Plain, just south of the Fall Line that separates the rock units of the northern New Jersey Piedmont from the unconsolidated Cretaceous sediments of the southern New Jersey Coastal Plain. According to a 2003 New Jersey Department of Environment Protection (NJDEP) hydrogeologic survey, elevations of the NJ Coastal Plain range from sea level to 400 feet ASML; however, more than half of the physiogeologic province exists below 50 feet AMSL.

According to the Geographic Information System (GIS) program “NJ-GeoWeb” available from the NJDEP, the surficial geology at the Site consists of salt-marsh and estuarine deposits of peat, organic silt and clay, sand and pebble gravel deposited during the Holocene sea-level rise. A wedge-shaped mass of unconsolidated and semi-consolidated siliciclastic sediments of Cretaceous and Cenozoic age, composed of alternating layers of clay, silt, sand, and gravel underlies the Coastal Plain of New Jersey, dipping gently to the southeast and thickening toward the Atlantic Ocean where it can reach a thickness of up to 6,000 feet.

The Site lies within the Duck Creek watershed in the Lower Delaware water region. The nearest body of water to the Site is the Delaware River which flows south to the Delaware Bay and separates Pennsylvania (to the west) and New Jersey (on the east). The property immediately adjacent to the south of the Site consists of small wetlands, which may have been affected by the release of water from the nearby municipal waste water treatment plant. Water-level measurements taken at existing monitoring wells on the Site indicate water levels at approximately 14 feet below ground surface.

2013 SUBSURFACE EXPLORATIONS

Seven test borings (SB-1 through SB-7) were drilled by Craig Drilling Companies, Inc. (Craig) of Mays Landing, NJ on May 15, 16, and 17, 2013. The approximate locations of the borings are indicated on Figure 2 and the logs are attached in Attachment B. Ground surface elevations were not available at the time of our investigation; but, the test borings were generally performed between Site elevation 18 and 20 feet referenced to the National Geodetic Vertical Datum of 1929 (NGVD29).

The borings were drilled using a mud-rotary drill rig equipped with safety hammers and automatic release systems for driving split spoon samplers in general accordance with ASTM D1586, the Standard Penetration Test (SPT). The SPT method consists of driving a 1-3/8-inch ID, 24-inch long split spoon sampler with a 140-pound weight falling a vertical distance of 30 inches. The number of blows required for each 6-inch increment of penetration was recorded. The cumulative number of blows required for the 6- to 18- inch interval of penetration is referred to as the Standard Penetration Resistance, or N value, which is a commonly used indicator of soil density and consistency. The samples were collected semi-continuously for the first 10 feet and at 5-foot intervals thereafter. In areas of asphalt, borings were advanced the first 6 inches through asphalt and then sampled as indicated above.



Soil borings SB-1, SB-2, SB-3 and SB-4 were advanced to a depth of about 32 feet below existing ground surface (bgs). Soil boring SB-5 was advanced to a depth of about 47 feet bgs, and borings SB-6 and SB-7 were advanced to a depth of about 27 feet bgs.

A GZA field engineer was present during drilling activities to observe and record drilling activities, transfer soil samples directly from split spoons to sample jars, label soil samples, and prepare our field boring logs. The soils were described in accordance with the Burmister Soil Classification System. Split-spoon soil samples were transferred from the sampler to appropriate sample containers following opening of the split-spoon. Sample containers were labeled with the project location, boring number, sample number, collection date and blow count. Split-spoon samples for soils laboratory testing were shipped to Thielsch Engineering of Cranston, RI.

Well Installation

GZA installed two 2-inch diameter temporary groundwater observation wells at the locations of test borings SB-2 (TW-2) and SB-4 (TW-1). The wells were installed to an approximate depth of 25 feet bgs and were completed with 5 feet of screen each. The portion of the test boring below a depth of about 25 feet (from the bottom of the test boring at 32 feet bgs to 25 feet bgs) had caved-in during temporary groundwater observation well installation.

GZA performed pneumatic slug tests at the temporary groundwater observation wells TW-1 and TW-2. Pneumatic slug testing utilizes positive pressure and vacuum to displace groundwater in the well to collect aquifer response data and estimate the hydraulic conductivity. Hydraulic conductivity is a measure of the ability of a material to facilitate water flow, and becomes more important as excavations extend to greater depths below the water table and hydraulic head differences increase. Data collected from the pneumatic slug tests was imported into the third-party software AQTESOLV to estimate hydraulic conductivity (*K*).

2017 SUBSURFACE EXPLORATION

GZA retained Enviroprobe Service, Inc. to perform utility locating services within a 10-foot diameter of the four (4) proposed drilling locations; one at each of the proposed ASTs. The work was performed utilizing ground penetration radar (GPR) and electromagnetic (EM) scoping technologies to investigate underground utilities and potential obstructions on November 9, 2017. Encountered utilities were marked on the ground using industrial standard colors; unknown utilities/ anomalies were marked in pink.

Four additional test borings (TB-1 through TB-4) were drilled within the footprint of the three ASTs and the buffer tank. The test borings were performed by Craig between November 13 and November 17, 2017 under supervision of a GZA field engineer. The approximate locations of the borings are indicated on Figure 2 and the logs are attached in Attachment B. Based on the available site plan drawings, including the Overall Site Plan drawing prepared by Amec and last updated in September 8, 2016, the borings were drilled between approximate site elevation 18 and 19 feet NGVD29.

The borings were advanced to approximately 122 feet bgs using a mud-rotary drill rig equipped with safety hammers and automatic release systems for driving split spoon samplers in general accordance with ASTM D1586, the Standard Penetration Test (SPT) as described above. The samples were collected semi-continuously for the first 12 feet and at 5-foot intervals thereafter. Two undisturbed Shelby tube samples were collected in



apparent cohesive soils per ASTM D-1587. The borings were advanced the first 6 inches through asphalt and then sampled as indicated above.

The soils were described in accordance with the Burmister Soil Classification System. Split-spoon soil samples were transferred from the sampler to appropriate sample containers following opening of the split-spoon. Sample containers were labeled with the project location, boring number, sample number, collection date and blow count. Selected split-spoon samples and the two (2) Shelby tube samples were shipped to TerraSense, LLC of Totowa, NJ for soils laboratory testing.

LABORATORY TESTING

Laboratory testing was performed on selected soil samples to estimate the soil index and engineering properties at the Site. Laboratory testing consisted of Atterberg Limits, natural moisture content determination, sieve analysis, unconsolidated undrained (UU) shear strength testing, and corrosion resistance testing (pH, sulfates, chlorides). The results are included in Attachment C, and are summarized below. The laboratory soil testing was performed in accordance with the following standard methods:

- Atterberg Limits (ASTM D 4318)
- Water Content (ASTM D 2216)
- Gradation Analysis (ASTM D 422)
- UU Shear Strength (ASTM D 2850)
- Corrosivity Analysis (ASTM 4972)

Grain Size Analysis

Twelve soil samples were submitted for grain size analysis, as summarized in the below table.

Grain Size Analysis			
Boring	Sample	Depth (ft)	Classification
SB-1	S-6	10-12	Light brown fine SAND, trace Silt (SP-SM)
SB-2	S-8	20-22	Dark brown fine SAND, some Silt (SP-SM)
SB-3	S-8	20-22	Dark brown fine SAND, some Silt (SP-SM)
SB-6	S-3	4-6	Brown Organic SILT, little fine Sand (SM)
SB-6	S-7	20-22	Brown fine to course GRAVEL, some fine to course Sand, trace Silt (GW)
SB-7	S-7	20-22	Light brown fine SAND, little Silt (SP-SM)
TB-1	S-8	20-22	Dark brown, fine to medium SAND and SILT (SM)
TB-1	S-16	60-62	Pale yellow, fine to coarse SAND, trace Gravel, trace Silt (SP-SM)



Grain Size Analysis			
Boring	Sample	Depth (ft)	Classification
TB-2	S-10	30-32	Brown, Clayey SILT (CL)
TB-3	S-5	8.5-10.5	Dark Brown, fine to coarse SAND, some Silt, little Gravel (SC)
TB-3	S-24	100-102	Pale yellow, fine to coarse SAND, little Silt (SM)
TB-4	S-1	0.5-2.5	Black, fine to coarse SAND, some Silt, trace Gravel (SM)

Water Content and Atterberg Limit Analysis

The following soil samples were submitted for Atterberg Limit and/or water content testing, as summarized in the below table.

Water Content and Atterberg Limit Analysis						
Boring	Sample	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %
SB-3	S-6	10-12	97.6	98	53	45
SB-4	S-8	20-22	34.9	28	21	7
SB-4	S-10	30-32	24.0	31	19	12
SB-6	S-3	4-6	111.3	98	54	44
TB-1	S-7	15-17	28.2	27	21	6
TB-1	S-8	20-22	20	-	-	-
TB-1	U-1	45-47	~20-29	-	-	-
TB-1	S-16	60-62	16.3	-	-	-
TB-2	U-2	17-19	~190-221	-	-	-
TB-2	S-10	30-32	21.7	-	-	-
TB-3	S-5	8.5-10.5	21.5	-	-	-
TB-3	S-12	40-42	21.9	23	15	8
TB-3	S-24	100-102	12.1	-	-	-



Water Content and Atterberg Limit Analysis						
Boring	Sample	Depth (ft)	Water Content %	Liquid Limit %	Plastic Limit %	Plasticity Index %
TB-4	S-1	0.5-2.5	19.2			
TB-4	S-6	10.5-12.5	93.8	78	41	37
TB-4	S-8	20-22	47.5	40	27	13

Pocket Penetrometer and Torvane

The unconfined compressive strength and/or undrained shear strength of select recovered soil sampled was estimated using a handheld pocket penetrometer and torvane; the measured values are summarized below.

Pocket Penetrometer and Torvane				
Boring	Sample	Depth (ft)	Pocket Penetrom. (tsf)	Torvane (tsf)
SB-5	S-11	35-37	1.0	--
SB-5	S-12	40-42	2.2	2.5
SB-5	S-13	35-47	4.5	3.5
TB-1	S-7	15-17	0.5	0.2
TB-1	S-12	40-42	2.25	0.5
TB-1	S-22	90-92	2.5	--
TB-3	S-7	15-17	1.0	--
TB-3	S-12	40-42	2.0	0.4
TB-3	S-13	45-47	2.5	0.45
TB-4	S-6	10.5-12.5	0.5	--
TB-4	S-7	15-17	0.5	--
TB-4	S-12	40-42	3.0	--



Shelby Tube Tests

Additional testing was performed on the cohesive undisturbed samples recovered from Shelby Tube samples; one collected from boring TB-1 and the second collected from TB-2. Shelby Tube unit weight testing was performed on TB-1, U-1 (depth 15-17 feet) and TB-2, U-2 (depth 17-19 feet) and UU shear strength testing was performed on TB-1, U-1. The results indicated a unit weight of approximately 126 pcf for TB-1, U-1, a unit weight of approximately 80 pcf for TB-2, U-2, and an undrained shear strength of approximately 2.2 tsf on the cohesive sample recovered from TB-1, U-1. The TB-2, U-2 Shelby tube was apparently disturbed during sampling and likely not representative.

Corrosivity Testing

Five soil samples collected from the upper 4 feet of its respective test boring location were submitted for corrosivity testing. Each was analyzed for corrosivity parameters including pH, conductivity/resistivity, chloride, and sulfate. These tests were performed to evaluate the presence of alkali and likelihood of corrosion of steel and degradation of concrete foundations exposed to these soils. The laboratory results are included in Attachment C, and are summarized below:

Corrosivity					
Boring ID	Sample ID	Depth (ft)	pH Std. Units	Chloride (mg/kg)	Sulfate (mg/kg)
SB-1	S-1	0-2	6.41	ND	313
SB-2	S-1	0-2	7.04	ND	66
SB-3	S-2	2-4	6.93	ND	598
SB-4	S-2a	2-3	10.4	101	713
SB-6	S-2	2-4	7.58	ND	358

ND: Not detected above method detection limits

pH:

Soils usually have a pH range of 5 to 8. In this range, pH is not considered to be the dominant variable affecting corrosion rates. More acidic soils (pH less than 5), however, represent a serious corrosion/degradation risk to common construction materials such as steel and concrete. The results of the laboratory testing on 4 of the 5 samples, pH values between 6.4 and 7.6 indicate that pH is not of significant concern affecting corrosion potential. One sample (SB-4, S-2a, 2'to3' bgs), had a pH of 10.4, which is more basic than the remaining samples and could be indicative of the concrete fill that was observed within this sample interval.

Sulfate:

The sulfate content ranged from 66 to 713 mg/kg or parts per million (ppm). This can also be expressed as 0.0066 to 0.0713 percent by weight. Table 4.3.1 of the ACI Building Code 318/318R lists the requirements for



concrete exposed to sulfate containing solutions. Sulfate exposure ranges according to the ACI Table are as follows:

Sulfate Exposure	Water Soluble Sulfate in Soil (percent by weight)
Negligible	0.00 - 0.10
Moderate†	0.10 - 0.20
Severe	0.20 - 2.00
Very Severe	Over 2.00

† Exposure to seawater is equivalent to moderate sulfate exposure (ACI Table 4.3.1)

According to the American Concrete Institute manual (ACI 318-02), the amount of sulfate detected in the soil samples are considered to be negligible for concrete exposure and there are no special requirements for concrete exposed to these soils.

Chloride:

Chlorides are generally corrosive to both concrete and steel, as they participate directly in the electrochemical reactions that take place during the corrosion process. Chlorides typically attack metals and also have the ability to migrate through porous concrete and attack the steel reinforcement. This can cause corrosion and swelling of the steel reinforcement which can lead to cracks in the concrete and therefore accelerated corrosion activity. According to DM-5 (U.S. Department of the Navy, 1974), concentrations of chloride in water greater than 500 ppm can be “extremely corrosive” to carbon steel and cast iron. The chloride content ranged from “ND” to 101 parts per million (ppm), suggesting that there is a low risk of a chloride attack.

GENERALIZED SUBSURFACE CONDITIONS

Based on the soil borings performed during this subsurface exploration, the generalized soil stratigraphy, in a descending order, is summarized below. Refer to the boring logs and laboratory test results that are attached in Attachment B and C, respectively, for more detailed information.

- Surface Cover: A portion of the Site contained an asphalt concrete (paved) surface – see test boring locations SB-2, SB-4, SB-6, SB-7, and TB-1 through TB-4. The surface at the remaining locations drilled consisted either of sandy fill (SB-1 and SB-3) or silty fill (SB-5).
- Fill: Fill soils were encountered within the upper portion of each test boring. It was difficult to distinguish between fill and indigenous soils unless obvious sign of fill were observed (concrete, wood, etc.). In general, fill soil was present to depths of between about 4 to 10 feet bgs. Loose to medium dense Sand Fill, with lesser and variable amounts of gravel and silt was found at depths ranging between 4 and 10 feet bgs in borings SB-2 through SB-5, and TB-1 through TB-4, along the eastern edge of the Site. Additionally, similar Sand Fill was encountered at SB-1. Medium dense, Silt Fill, with lesser and variable



amounts of sand and gravel was encountered to approximately 4 feet bgs in SB-6 and SB-7 in the southwest corner of the Site. The uncorrected N values for the Fill soils ranged from 4 blows per foot (bpf) to refusal (that is, greater than 100 bpf for less than 6 inches of penetration of the split spoon sampler), with an uncorrected average N value of about 21 (using a value of 100 bpf for refusal zones); indicating a primarily medium dense condition.

- Organics: An Organic stratum consisting of predominantly, Organic Silt, Organic Clay, or fine-grained Peat (or soft clay /clayey silt in some areas), with varying sand content, was encountered beneath the Fill in SB-2, SB-6, and SB-7, and TB-2; and, beneath the Upper Sand/Silt (see below) in borings SB-3, SB-4, SB-5, TB-1, TB-3, and TB-4. This layer was not encountered in SB-1. The Organics stratum ranged from approximately 3 to 15 feet thick and was encountered from depths ranging between 4 feet and 23 feet bgs. This stratum was observed to be generally soft with uncorrected N values ranging from “Weight of Hammer” to 10 bpf, with an uncorrected average N value of about 3 bpf. “Weight of Hammer” indicates a 24-inch penetration of the split spoon sampler under just the weight of hammer; that is, no blows.
- Upper Sand/Silt: An Upper Sand/Silt stratum was encountered in the test borings beneath the Fill in TB-1, TB-3, TB-4, SB-1, SB-3, SB-4, and SB-5, and beneath the Organics in TB-2, SB-2, and SB-7. This layer was not encountered in SB-6. The Organics stratum discussed above cuts the Upper Sand/Silt stratum in borings TB-1, SB-3, and SB-5. The Upper Sand/Silt stratum is described as fine to coarse Sand with a varying gravel and silt content or Silt with varying sand and gravel content. This stratum ranged from 2 to 13 feet thick and was encountered from depths ranging between 4 feet and 25 feet bgs. This stratum was observed to be generally medium dense with uncorrected N values ranging from 1 to 49 bpf, with an uncorrected average N value of about 15 bpf.
- Gravel: A Gravel stratum was encountered in each test boring beneath the Organics and/or Upper Sand/Silt strata. This layer was described as Gravel with up to 50 percent sand or fine to coarse sand with up to 50 percent gravel. Silt content of up to 15 percent was encountered in this layer. The Gravel stratum ranged from approximately 2 to 15 feet thick and was encountered from depths ranging between 18 and 38 feet bgs in borings where the stratum was fully penetrated. This stratum extended to the termination depth of five of the eleven test borings at depths ranging between 27 and 32 feet bgs; SB-1, SB-2, SB-3, SB-6, and SB-7. This stratum was observed to be generally dense with uncorrected N values ranging from 15 to 84 bpf, with an uncorrected average N value of approximately 43 bpf.
- Clay: A Clay stratum was encountered in test borings TB-1 through TB-4, SB-4, and SB-5 beneath the Gravel layer. This layer was described as medium stiff to hard Silty Clay, Clayey Silt, Silt&Clay, or Clay&Silt with varying sand and gravel content. The Clay stratum ranged from approximately 11 to 19 feet thick and was encountered from depths ranging between 27 to 53 feet bgs in borings where the stratum was fully penetrated. This stratum extended to the termination depths of SB-4 and SB-5 at 32 feet and 47 feet respectively. The uncorrected N values ranged from 7 to 43, with an uncorrected average N value of 20; indicating a primarily very stiff condition.
- Lower Sand: Medium dense to very dense sand, with varying amounts of silt and gravel was encountered below the Clay stratum in test borings TB-1 through TB-4 and extended to the termination depth of 122 feet bgs in each boring. Lenses of Silt/Clay up to about 5 feet thick were encountered within the Sand



stratum at various depths in test boring TB-1 through TB-3. The uncorrected N values ranged from 18 to greater than 100, with an uncorrected average N value of 55; indicating a primarily very dense condition.

In 2013, groundwater was not measured in the SB borings during drilling because water was added as a component of the mud-rotary drilling operation; however, ground water levels were determined by examining the relative saturation of soils as samples were collected. Water level readings were also measured at an existing monitoring well on Site and within the temporary groundwater observation wells installed. The water table was encountered at about 14 feet bgs.

In 2017, groundwater was measured in each of the TB borings after approximately 17.5 hours of stabilization. The water table was encountered between approximately 14.6 feet and 17.7 feet bgs.

HYDRAULIC CONDITIONS

Slug testing at each of the two temporary wells installed in 2013 displayed hysteretic effects likely due to the wells being under developed. In the several tests performed at TW-1, the estimated K ranged between 1.3 and 4.2 feet per day (ft/day) and averaged 2.4 ft/day. The K estimates at TW-2 ranged between 0.05 and 1.5 ft/day; the average is 1 ft/day. These values agree with published values for silty sands and fine sands (Fetter 1994). Although GZA was unable to verify the location and construction characteristics of an existing Site groundwater monitoring well (MW-3), the August 2009 Resource Control Corporation (RCC) Groundwater Remedial Investigation Report text states that the slug test estimated K at MW-3 is 30.5 ft/day. This K value corresponds to published values for well sorted sands or gravels; sands and gravels were identified at depths below 22 feet at SB-2 and 25 feet at SB-4.

Based on the subsurface conditions described in previous sections, the overburden soils observed at the Site range from organic fine grained sediments (soft silt and clay) to gravels; therefore, hydraulic conductivity will also vary greatly. The rate of construction dewatering, if considered necessary based on the planned construction means and methods, will depend on several factors: 1) depth below the water table, 2) excavation into relatively high K material, 3) support of excavation, and 4) groundwater cutoff or dewatering method. Excavations below the water table would require additional permitting, dewatering operations (including pumping and treatment), and possible disposal costs.



IMPLICATIONS OF SUBSURFACE CONDITIONS

The existing near surface fill layer is considered generally unsuitable for support of foundations, due to its variability in composition and relative density and consistency, unless lightly loaded (allowable bearing of 1,000 psf or less) structures are considered. Also, the underlying soft to medium Organic layer is compressible, with settlement that could extend to 12-inches or more if loaded with a 5,200 psf bearing pressure.

In general, the apparent natural materials below a depth of 22 to 25 feet are considered to be a competent bearing material for support of the planned ASTs and truck scale. Therefore, it is recommended that for heavier loads (greater than 1,000 psf allowable) either the unsuitable overbearing soils be improved or that deeper foundations be considered. For ease of input into various computer programs (LPile), a table of a conceptual soil profile, with recommended soil index properties, is provided in our Conclusions and Recommendations section under Soil Properties to summarize general soil conditions.

For lightly loaded structures (allowable bearing loads of 1,000 psf or less), a shallow spread foundation, short drilled piers, or helical anchors can be considered.

For the heavier loads at the planned tank locations in the northeast corner of the Site, GZA considered the following three ground improvement options.

1. Excavation of the upper 10-feet of overburden soil or to about 2-feet above the ground water table, whichever is deeper; then placement of a geogrid geosynthetic layer; followed by replacement of the excavated granular soil using controlled compaction methods. The resulting settlement that may be experienced is still considered too large (up to approximately 24-inches) due to the underlying compressible organic and lower clay layers.
2. The amount of total settlement can be reduced through pre-loading the areas planned for construction, which involves the placement of a large soil mass over the area planned for construction for a defined period of time (generally 6-months or more), followed by removal of the soil mass prior to construction. It is anticipated that a 10-foot to 20-foot thick soil mass would be required, depending on location and final loading conditions. Installation of pre-fabricated vertical drains would be recommended to expedite the consolidation of the underlying organics.
3. The use of structural elements be considered to improve the upper 25-feet of soil. GZA contacted the following three soil improvement companies to discuss this option and it is considered feasible. We would recommend that the following soil improvement options be considered and evaluated further.
 - a. GeoStructure Inc.'s Geo-Piers
 - b. Hayward Baker Vibro-Pier (Stone Columns) or Vibro Concrete Column
 - c. Menard Group USA's Vibro-Stone Column

CONCLUSIONS AND RECOMMENDATIONS

The following sections of this report provide foundation recommendations for heavier loaded structures (planned tanks in northeast corner of the Site) and lighter loaded structures (truck scale and associated building in southwest corner of site, equipment pads on west-central and east-central portions of site, and truck delivery area and biogas dome in southeast quadrant of the Site). As mentioned above and based on our assumptions, either soil improvement or a deep foundation option is more suitable for the planned construction of the heavier loaded tanks in the northeast



corner of the Site. The fill, organic, and upper sand/silt strata are generally not suitable as foundation bearing materials in its current state. Therefore, shallow foundations are not generally feasible at this site unless light loads are considered (1,000 psf or less). Helical piles can also be considered for the lighter loaded structures. For deep foundations, driven H-piles, concrete filled pipe piles or drilled caissons (piers) can be considered for the AST foundations and are discussed further. The drilled pier and helical pile options would limit vibration considerations associated with driving H-Piles or pipe piles. Other pile types such as auger-cast piles, may also be viable based on market conditions at the time of construction.

The useable pile capacity and pile type will be influenced by the final site grades, tip grades and penetration resistance at the end of driving. If the site grade is raised relative to the current site grade, this could lead to downdrag forces on the piles due to consolidation settlement of the Organic and clay strata, and to a reduction in the useable pile capacity. We assume that the site grade will not be increased.

A ground water level of 10-feet bgs is recommended for design purposes (corresponding to approximate El. 10 feet, NGVD29).

Soil Properties

In their unimproved states, it is recommended that the following general soil profile and corresponding soil properties be used for design purposes (including for LPILE analysis).

Stratum	Total Unit Weight (pcf)	Friction Angle (deg)	Cohesion (psf)
Fill	115	30	-
Organic Silt/Clay or Peat	80	-	250
Upper Sand/Silt	120	32	-
Gravel	130	36	-
Clay	130	-	2,500
Sand	135	38	-

Drilled Piers or Caissons

The allowable axial bearing and uplift capacities for a 24-inch diameter pier sizes with a 30 and 50-foot depth of embedment is shown on the table below. The allowable values shown are in tons.



Pier Diameter	Tip Depth BGS	Compressive Axial Design Capacity (tons)	Uplift Axial Design Capacity (tons)
24-Inches	30-feet	25	12
24-Inches	50-feet	65	30

General installation procedures recommended for drilled piers or caissons follows.

- Drilled piers shall be spaced no closer than three times the pier diameter (center to center) unless otherwise approved.
- The bottom of the drilled pier shall be cleared of as much of the remaining loose soil as possible.
- Reinforcement steel (rebar cage) is placed prior to concrete placement. Care shall be taken to minimize damage during installation and to secure the rebar cage in place to prevent movement during concrete placement.
- Concrete is pumped through casing until clean grout overtops the casing. The quantity of concrete pumped should be checked against the calculated volume of the pier.
- Pier or caisson installation logs shall be completed for each location. Information included shall, at a minimum, consist of pier designation, location, length, tip elevation, calculated and actual concrete quantity, reference elevation measurement, reinforcement steel data, concrete sample collected (yes or no), etc.
- A load test on either a production or indicator pier shall be conducted to assess the axial compression and tension/uplift suitability of the pier/caisson design.

Steel H-Piles

As an alternate to drilled piers or caissons, end-bearing steel H-piles may be utilized. Such piles would be driven to a specified design tip elevation. We have provided typical loads for a common H-pile driven to a tip elevation of 50-feet and 60-feet bgs. If additional loads are needed per pile, GZA can refine its analysis and consider deeper tip elevations or larger H-pile sections.

H-Pile Size	Tip Depth BGS	Compressive Axial Design Capacity	Uplift Axial Design Capacity
	(feet)	(tons)	(tons)
HP-12x53	50	45	20
HP-12x53	60	60	30



Wave Equation analyses should be performed by the Contractor based on the actual hammer and pile size to confirm the driving criteria prior to installing piles.

In lieu of performing static pile load tests, we recommend at least 10 percent of all piles installed be dynamically tested utilizing a Pile Dynamic Analyzer (PDA) as manufactured by GRL, or equivalent. Prior to driving piles, the piling contractor should be required to submit a predictive dynamic pile analysis (WEAP analysis) for each pile type, soil condition, and/or proposed piling hammer in order to determine the driving resistance required to achieve an ultimate capacity equal to or greater than the design capacity multiplied by the safety factor plus twice the anticipated down drag force. Twice the down drag force is included in the load testing to account for the additional load that the pile tip may experience in the future and again to overcome that upward resistance provided by the fill soils at the time of testing. The WEAP analysis must show that the pile will not be overstressed at any point during driving. That analysis should be reviewed by GZA. Only after acceptance of the analysis, should the Contractor install piles.

The PDA testing program should consist of testing at least 2 percent of all piles during initial drive, for each pile hammer utilized, or after major maintenance of pile hammer.

Concrete-filled closed-end steel pipe piles

Piles consisting of steel pipe driven to a tip elevation of 50-feet and 60-feet bgs that are filled with concrete are considered. The piles are recommended to be driven closed ended to increase the amount of soil displacement and friction.

We have calculated design capacities as indicated in the Table below.

Outside Pile Diameter	Wall thickness	Tip Depth BGS	Concrete fill compressiv e strength	Compressiv e Axial Design Capacity	Uplift Axial Design Capacity
(in)	(in)	(feet)	(psi)	(tons)	(tons)
12.75	0.375	50	4000	35	20
12.75	0.375	60	4000	50	25

Wave Equation analyses should be performed by the Contractor based on the actual hammer and pile size to confirm the driving criteria prior to installing piles.

A 1-inch thick boot plate with a maximum diameter equal to or less than the outside pile diameters should be bevel-grooved welded to the pile tip and ground smooth to account for hard driving on obstructions. The plate and weld should not extend beyond the diameter of the pipe so that no separation between the pile and the ground exists after driving. Concrete in-fill may be placed by free-fall after the pipe has been sounded and determined to be straight, vertical, and clear of water.

In lieu of performing static pile load tests, we recommend at least 10 percent of all piles installed be dynamically tested utilizing a Pile Dynamic Analyzer (PDA) as manufactured by GRL, or equivalent. Prior to driving piles, the piling contractor should be required to submit a predictive dynamic pile analysis (WEAP analysis) for each pile type, soil condition, and/or proposed piling hammer in order to determine the driving resistance required to achieve an ultimate capacity equal to or greater than the design capacity multiplied by the safety factor plus twice the anticipated down drag force. Twice the down drag force is included in the load testing to account for the additional load that the pile tip may experience in the future and again to overcome that upward resistance



provided by the fill soils at the time of testing. The WEAP analysis must show that the pile will not be overstressed at any point during driving. That analysis should be reviewed by GZA. Only after acceptance of the analysis, should the Contractor install piles.

The PDA testing program should consist of testing at least 2 percent of all piles during initial drive, for each pile hammer utilized, or after major maintenance of pile hammer.

Helical Piles for Lighter Bearing Structures

There are planned smaller and lighter bearing structures considered at the site, including equipment pads on the west and east side of the plant, a truck scale at the southwest side of the plant, and the biogas storage dome in the southeast part of the plant. Helical piles (anchors) can be considered to support these structures instead of drilled piers or other deeper pile foundation option, as noted below.

1. Helical anchors spaced at 6-foot on center, 14-inch diameter helix at a minimum depth of 26-feet below existing ground surface, with supporting equipment (round shaft, bracket, etc.) are considered capable of supporting an allowable axial load of 24 kips, allowable uplift load of 16 kips, and allowable lateral loads of 1.5 kips (which is half the lateral load required to deflect the pile 1 inch calculated using LPILE v2012 software).
2. Helical anchors spaced 6-foot on center, consisting of two 10-inch diameter helices in a series placed at a depth of 26-feet and 29-feet, with the applicable supporting equipment (round shaft, bracket, etc.) are also considered capable of an allowable axial load of 24 kips, allowable uplift load of 16 kips, and allowable lateral loads of 1.5 kips (which is half the lateral load required to deflect the pile 1 inch calculated using LPILE v2012 software).

It is recommended that the final helical pile design be completed by the helical pile manufacturer or installer and stamped by a professional engineer registered in New Jersey.

Shallow Spread Foundations

There may be a need for lightly loaded (1,000 psf or less) shallow spread foundations. If applicable, the proposed spread foundations should bear on a 12-inch thick layer of structural fill underlain by a separation geotextile and the existing medium dense granular soil (Fill) subgrade.

Structural Fill placed beneath spread foundations must extend beyond the foundation limits a distance equal to the thickness of the Structural Fill (Granular Fill, Crushed Stone) beneath the foundation. Foundation excavations therefore should be sized accordingly.

Spread foundations constructed on controlled Structural Fill placed and compacted over the separation geotextile and suitable subgrade can be sized based on a maximum net allowable bearing pressure of 1,000 pounds per square foot (psf).



Continuous strip foundations should be at least 2 - feet in width and individual foundations should be at least 3 - feet width. Foundations should be embedded a minimum of 3-feet below lowest adjacent grades for bearing capacity or deeper if local building requirements specify a deeper depth for frost protection.

Foundations subject to eccentric loading, as the result of lateral loads and overturning moments, should be sized such that the resultant of the loads is within the middle third of the foundation and that no portion of the footing is in tension. Maximum edge bearing pressures, for eccentrically loaded footings, should not exceed the above net allowable bearing pressure.

Slab-on-Grade

Slab-on-grade construction shall follow our subgrade preparation recommendations as outlined later in this document. A minimum of 12-inches of controlled Structural Fill/Subbase Stone, is recommended beneath floor slabs, underlain by a separation geotextile. It is recommended that the slab-on-grade be constructed such that it is not structurally connected to, or resting upon, perimeter walls or column footings in order to limit differential settlement effects.

Seismic Design

Based upon the limited subsurface information, it is GZA's opinion that the site soils are not considered liquefaction susceptible. GZA anticipates that the site soil profile is a Site Class E.

The following seismic design values are in accordance with the 2015 International Building Code (as adopted by New Jersey), Section 1613:

<u>Parameter</u>	<u>Value</u>
Site Class (Stiff Soil Profile)	E
Maximum Considered Earthquake Spectral Response Accelerations for short period (S_{ms})	0.547 g
Maximum Considered Earthquake Spectral Response Accelerations for 1 second (S_{m1})	0.221 g

Underground Utilities

Underground pipes and utilities should be placed on bedding in accordance with the manufacturer's specifications. "Granular Fill" should be placed in lifts on the sides and above the utilities and compacted to at least 92 percent of the maximum dry density as determined in accordance with ASTM D-1557 (modified Proctor test). Compaction should be performed with hand-operated equipment with lift thickness depending on the size of equipment used. Should utilities be located below slabs and foundations, backfill should be compacted to at least 95 percent of the maximum dry density. Base and sub-base courses for pavements should also be compacted to 95 percent of the maximum dry density, if located over utilities.

Utility design and construction will need to consider differential settlement; therefore, flexible connections should be incorporated at the interface between rigid structures (slab-on-grade, foundation walls, etc) and site soils.



Lateral Soil Pressure

Although we understand that no below grade structures are planned, the following lateral earth pressures are recommended for design of below grade structures, if plans change. These recommended pressures are based on our assumption that below grade walls or retaining walls will be backfilled with free-draining granular material (Sand-Gravel Fill within 3 feet laterally of the back of the wall), and that hydrostatic pressures are relieved by drainage. Foundation drains are recommended for any walls subject to unbalanced lateral earth pressures. If the foundations elevations are below the groundwater elevation (assume 10 feet below ground surface for design purposes) and the hydrostatic pressures are not relieved by drainage, hydrostatic pressures should be added to the lateral earth pressures. Surcharge loads, such as truck traffic, adjacent buildings, and embankment soils, should also be added to static loads for design.

- The recommended coefficient of friction for lateral sliding is 0.45 (concrete to soil). Backfill behind walls and embedded foundations should be compacted to at least 95 percent of the maximum dry density as determined in accordance with ASTM D-1557 (modified Proctor test).
- Retaining walls with level backfill that are restrained against rotation at the top (such as a basement wall) should be designed using an at-rest lateral pressure coefficient of 0.5 with an unsaturated unit soil weight of 125 pounds per cubic foot.
- Retaining walls that are free to rotate at the top, such as exterior retaining walls, should be designed using an active lateral soil pressure coefficient of 0.33, with an unsaturated unit weight of soil of 125 pounds per cubic foot.

The minimum factors of safety for sliding and overturning under static loads should be 1.5 and 2, respectively. Passive pressure at the toe of the walls should not be included as a resisting force when analyzing for overturning and sliding.

Pavement or Concrete Slab Considerations – Access and/or Parking

Pavement design recommendations are provided for the following two (2) types of pavement structures.

- Heavy Duty Asphalt Concrete Pavement (Access Driveways and Truck Delivery Areas);
- Concrete Pads, includes the proposed truck unload containment slabs.

GZA recommends the use of a separation geotextile beneath the subbase course in pavement areas. We also recommend the following components and thicknesses for each pavement structure type based on the site and subsurface conditions encountered and our evaluation.

Heavy Duty Asphalt Concrete Pavement

- 1-inch - Wearing Course
- 3-inches - Binder Course
- 12-inches - Subbase Course
- Separation Geotextile



Portland Cement Concrete Pavement

- 8-inch thick Portland cement concrete slab reinforced with welded wire mesh
- 12-inches - Subbase Course
- Separation Geotextile

It may be necessary to increase the subbase course thickness in some areas to improve subgrade conditions and to promote drainage to underdrains, etc. For Concrete Pavement areas, the subgrade should be prepared in accordance with the “Subgrade Preparation” section of this report.

Materials for the above pavement structure components should consist of the following:

- Portland Cement Concrete Slabs - 4,500 psi minimum compressive strength Portland cement concrete and welded wire mesh reinforcement
- Subbase Course - Shall be Structural Fill (Granular Fill, Crushed Stone, etc)
- Geotextile - Woven polypropylene stabilization/separation geotextile (i.e., Mirafi 160N or approved equivalent).

The base course shall be compacted to 98% of its maximum dry density and the sub-base course shall be compacted to 95% of its maximum dry density. Providing proper drainage will improve the access road performance and reduce the on-going maintenance that may be required. GZA recommends that the subgrade surface be graded from crest to edge at a 2% slope to either adjacent underdrains and/or to adjacent drainage swales such that water does not accumulate in the subbase course materials or collect on the subgrade soils.

CONSTRUCTION RECOMMENDATIONS

Based on the results of our subsurface investigation, the exposed subgrade soils may be sensitive to disturbance and strength degradation in the presence of excess moisture. Construction traffic over exposed subgrades should be minimized. The subgrade soils that are silty (fine grained) are frost susceptible if allowed to get wet and are not properly drained.

The contractor should plan and conduct its operations in a manner which protects and considers the sensitivity of the soils to moisture and frost. A gravel-working mat may be appropriate to protect subgrades in these soils. If the exposed subgrades should become disturbed, they should be undercut accordingly.

Excavations must be adequately dewatered and sloped back or properly sheeted for stability and safety in accordance with OSHA requirements as a minimum.

Construction Dewatering

Construction dewatering will be required for surface water control and for excavations which encounter perched groundwater conditions. Surface water should be diverted away from open excavations and prevented from



accumulating on exposed subgrades. The exposed soil subgrades will be susceptible to strength degradation in the presence of excess moisture.

Based on the groundwater conditions encountered in the test borings (shallow granular soils over fine-grained soils), it is possible that perched groundwater may be encountered at some locations. Although, not encountered during our subsurface investigation, our experience notes that the amount of groundwater that could be encountered will depend on the excavation location, depth, the permeability of the soils encountered and the actual groundwater conditions at the time of construction. It is anticipated that sump and pump methods will be suitable to control perched groundwater.

Subgrade Preparation

Existing utilities, if present, should be removed from within the proposed newbuilding or slab-on-grade footprint, and within an area extending two feet beyond that footprint. Areas of unstable ground should be over-excavated until the exposed ground is stable and firm. The over-excavated soils should be replaced with compacted granular fill, nominally compacted crushed stone wrapped in filter fabric, or lean concrete (concrete with $f'c \leq 2,000$ psi).

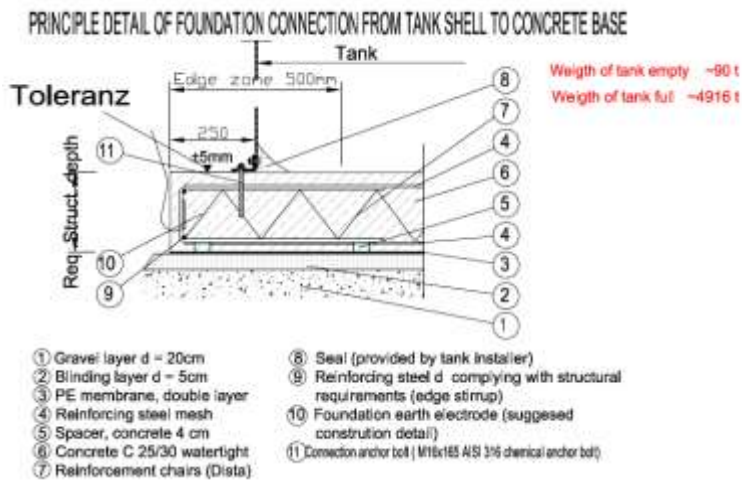
If soil improvement has not occurred, excavate to at least 12-inches below the bottom of the proposed shallow spread foundation, slab-on-grade or pavement section and compact the subgrade with a minimum of 6 passes in each direction of a self-propelled vibratory roller having a drum weight of at least 10,000 pounds and a dynamic force of 20,000 pounds prior to placement of the new slab-on-grade or pavement section. For shallow spread foundations this may not be practical; in those instances, compact the subgrade with a 1,000-lb or better walk behind compactor as noted in the "Placement and Compaction" section below.

If soil improvement has occurred, excavate to the bottom of the proposed shallow spread foundation, slab-on-grade or pavement section and compact as noted above.

Subbase, base courses and structural/granular fill placed below the shallow spread foundations, slab-on-grade or pavement sections should be compacted in 1-foot (maximum) lifts to at least 95% of the maximum dry density as determined in accordance with ASTM D-1557 (modified Proctor test). Fill placed as general fill in non-loaded areas should be compacted to at least 92 percent of the maximum dry density.

A geotextile separation or reinforcement fabric overlain by 6 to 12 inches of stone will be required to allow work on subgrade that is silty or clayey in composition. These fine-grained soil subgrades can also be protected with a lean concrete "mud mat".

The ASTs planned for the northeast corner of the site will generally be constructed over a granular silt or sand fill that overlays the softer clay layer. Groundwater is anticipated to be at a depth of about 10-feet below ground surface. An AST foundation detail provided by Amec (as recommended by the AST manufacturer) is provided below.



The AST manufacturer recommends a “PE membrane, double layer” to be placed between the concrete slab-on-grade and the underlying “blinding layer.” Our assumption is that the “blinding layer” is a concrete mud mat and the “PE membrane, double layer” is a 6-mil to 12-mil (each layer) polyethylene moisture or vapor barrier. Although, the “PE membrane, double layer” may be intended as a slip layer between the “blinding layer” and the overlying concrete slab. Published friction coefficients between concrete and a smooth PE membrane for design use as a slip layer range from 0.15 to 0.2. If the “PE membrane’s” intended use is as a vapor or moisture barrier, and a friction

coefficient of 0.15 to 0.2 is too low for the project’s design needs, then we would recommend that a roughened or spiked geomembrane be used to increase frictional resistance. The coefficient of friction for a roughened or spiked high density polyethylene against concrete can range from 0.5 to 0.7.

Fill Material and Compaction

Compacted fill placed below the planned slab-on-grades should consist of clean, granular fill placed on a proof-rolled subgrade. The fill should be compacted to at least 95 percent of its maximum dry density obtained from the Modified Proctor Test (ASTM D1557). The recommended maximum loose lift thickness of fill and minimum number of passes of compaction equipment are provided below.

A minimum thickness of six inches of sand-gravel is required as bedding material for utilities with a diameter of up to one foot, 8 inches for utilities with a diameter of up to three feet, and 12 inches for larger utilities. The maximum grain size should not exceed $1/10$ of the maximum diameter of the utility. A geotextile separation or reinforcement fabric may be required to allow work on utilities placed over the saturated organic soil stratum. The sand-gravel bedding should be nominally compacted with a hand-operated vibratory plate or light roller.

Reuse of In-Situ Soils for Compacted Fill

The Site soil profile includes soils that contain organics and/or fines (silts and clays), where the fines content was measured at 33 and 86% (by weight). These soils require substantial moisture conditioning efforts prior to use as compacted fill; therefore, we do not recommend using them as compacted structural fill underneath foundations or adjacent to foundations with sloped excavations. Soils containing organics and/or a significant percentage (greater than 30% by weight) of fines can be used as fill for non-structural purposes (e.g., earth berms for ornamental purposes or surface water control). In-Situ soils used for non-structural purposes should be moisture conditioned and compacted to at least 92% of the maximum dry density obtained from the Modified Proctor Test (ASTM D1557). We restate the difficulties in handling these materials even if they are only used for non-structural purposes given the substantial moisture-conditioning efforts they require.



Temporary Excavation Support

It is not anticipated that temporary excavation support systems will be required. However, if needed, the Owner and the Contractor should be familiar with applicable local, state and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) excavation and trench safety standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. We are providing this information solely as a service to our Client. Under no circumstances should the information provided herein be interpreted to mean that GZA is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

If sloped excavations are used, we recommend a slope of less than 1 (V): 1.5 (H) above the water table, and less than 1 (V) : (2) H below the water table. The Contractor should be aware that slope height, slope inclination, or excavation depth should in no case exceed those specified in local, state, or federal safety regulations such as OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties. Per OSHA requirements, if any excavation is extended to a depth of more than 20 feet, it will be necessary to have the side slopes designed by a Professional Engineer.

The Contractor can also provide temporary vertical excavation support systems ("shoring") as an alternative to temporary sloped excavations. The Contractor or the Contractor's specialty subcontractor would be responsible for the design of the excavation support system in accordance with applicable regulatory requirements, and with the lateral earth pressure recommendations provided in this report. All excavation support systems should be designed by a Professional Engineer.

As a safety measure, we recommend that all vehicles and soil piles be kept a minimum lateral distance from the crest of slopes of no less than one third the slope height. Exposed slope faces should be protected against erosion by the elements.

Materials

All fill should be free from ice, snow, roots, sod, rubbish, and other deleterious or organic matter. Gradation requirements for the above-mentioned fills should meet the requirements described below.



Sieve Size	Percent Finer By Weight			
	Sand-Gravel Fill	Granular Fill	¾-Inch Crushed Stone	1½-Inch Crushed Stone
*	100	100	-	-
1½-inch	-	-	-	100
1-inch	-	-	-	85-100
¾-inch	-	-	90-100	10-40
½-inch	50-85	-	10-50	0-8
No. 4	40-75	-	0-5	-
No. 10	30-60	30-95	-	-
No. 40	10-35	10-70	-	-
No. 100	5-20**	-	-	-
No. 200	0-8	0-10	-	<1

* The maximum recommended stone size is 4 inches where used as a base course below slabs; elsewhere, maximum stone sizes should be 2/3 of the loose lift thickness.

** The amount passing the No. 100 sieve should be between forty percent (40%) and seventy percent (70%) of that amount passing the No. 40 sieve.

Placement and Compaction

The recommended minimum compaction for fill and backfill beneath footings and foundations is 95 percent of the maximum dry density as determined by ASTM D1557 (modified Proctor density). Guidance for lift thickness versus compaction equipment is provided below. Lift thicknesses should be adjusted as required in order to achieve the minimum compaction requirements.

Compaction Method	Maximum Stone Size	Maximum Loose Lift Thickness		Minimum Number of Passes	
		Below Structures and Pavement	Less Critical Areas	Below Structures and Pavement	Less Critical Areas
Hand-operated vibratory plate or light roller in confined areas	3"	6"	8"	6	4



Compaction Method	Maximum Stone Size	Maximum Loose Lift Thickness		Minimum Number of Passes	
		Below Structures and Pavement	Less Critical Areas	Below Structures and Pavement	Less Critical Areas
Hand-operated vibratory drum rollers weighing at least 1,000# in confined areas	6"	8"	10"	6	4
Light vibratory drum roller, minimum dynamic force 3,000# per foot of drum width	6"	10"	14"	6	4
Medium to heavy vibratory drum roller, minimum dynamic force 5,000-8,000# per foot drum width	8"	12"	18"	6	4

The Contractor should reduce or stop drum vibration if pumping or weaving of the subgrade is observed.

Quality Assurance and Control

We recommend that an engineer knowledgeable in soils and foundations and the requirements of the IBCNJ be retained to inspect, verify, and approve earthworks, subgrades, and underpinning. This includes the review of plans prior to bidding and site-inspection at the time of construction. Such work is intended to reduce unexpected circumstances throughout the bidding and construction process. Site inspections are intended to document and verify that the contractor's plans are implemented as designed and approved. This includes verifying that the appropriate bearing stratum has been reached, that the subgrade has been properly prepared for foundation construction, and that foundation piles have been installed per design requirements and in the manner proposed.



January 5, 2018
12.0076146.20
Trenton BioGas, LLC
Page | 24

Should you have any questions on the contents of this report, please contact the undersigned.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

A handwritten signature in blue ink, appearing to read 'And Rizk', with a long, sweeping horizontal line extending to the right.

Andrew Rizk, P.E.
Senior Project Manager

A handwritten signature in blue ink, appearing to read 'Ernest Hanna', with a stylized, cursive script.

Ernest R. Hanna, P.E.
Principal

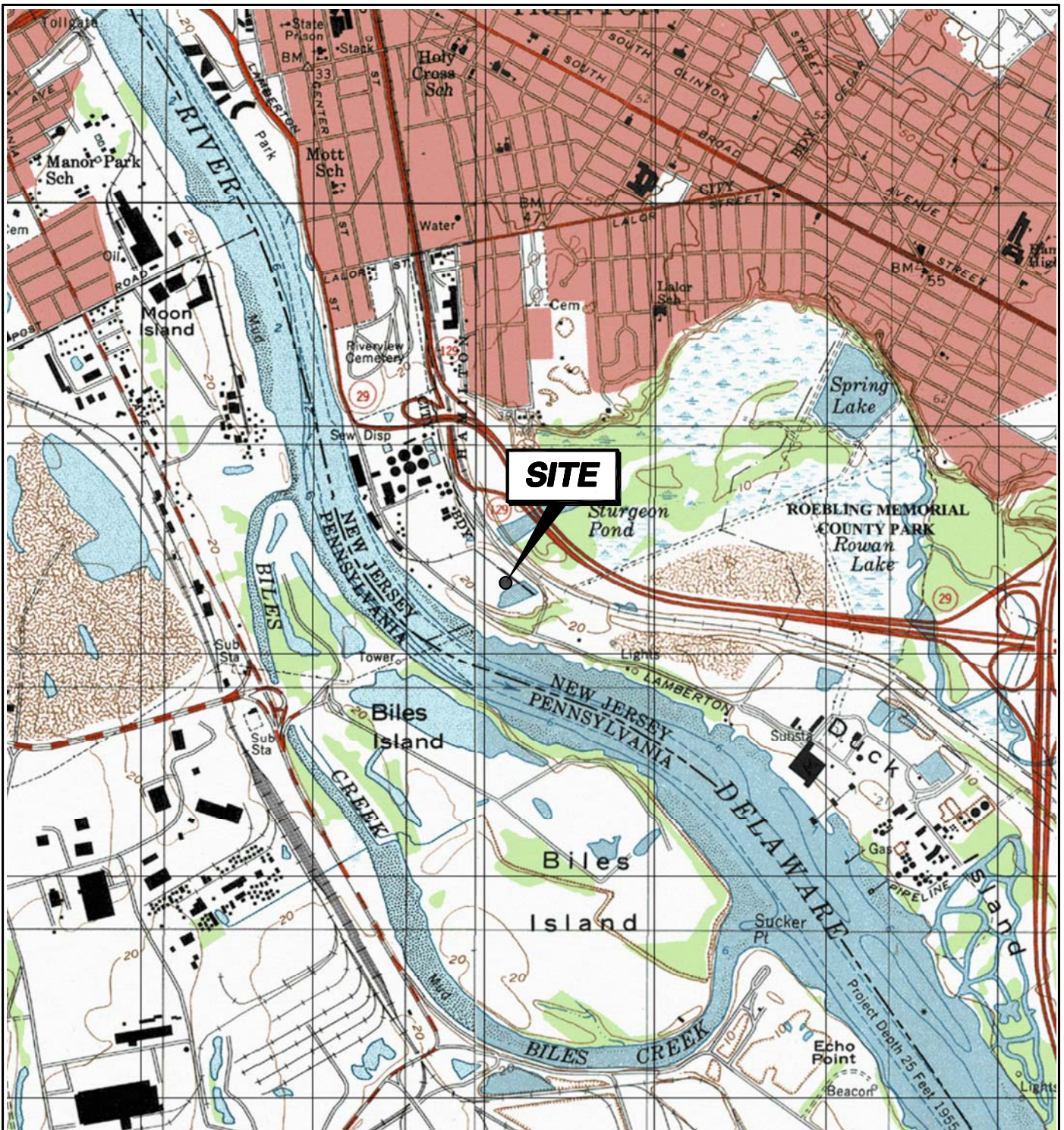
A handwritten signature in blue ink, appearing to read 'Douglas S. Roy', with a stylized, cursive script.

Douglas S. Roy, P.E.
Consultant Reviewer

Attachments:	Figure 1:	Site Locus Map
	Figure 2:	Exploration Location Plan
	Attachment A:	Limitations
	Attachment B:	Exploration Logs
	Attachment C:	Laboratory Test Results

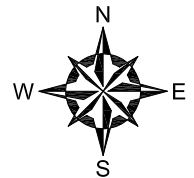


FIGURES



QUADRANGLE LOCATION

SOURCE:
USGS TOPOGRAPHIC MAPS: TRENTON EAST, NJ (1995) &
TRENTON WEST, NJ-PA (1995). CONTOUR INTERVAL 10 FT.,
ORIGINAL SCALE 1:24,000 (1" = 2,000 FT.)



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TRENTON BIOGAS
1600 LAMBERTON ROAD
TRENTON, NEW JERSEY

PREPARED BY:

GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:

TRENTON BIOGAS

SITE LOCATION PLAN

PROJ MGR: AR

REVIEWED BY: AR

CHECKED BY: ERH

DESIGNED BY: VB

DRAWN BY: EM

SCALE: 1" = 200'

DATE:

PROJECT NO.

REVISION NO.

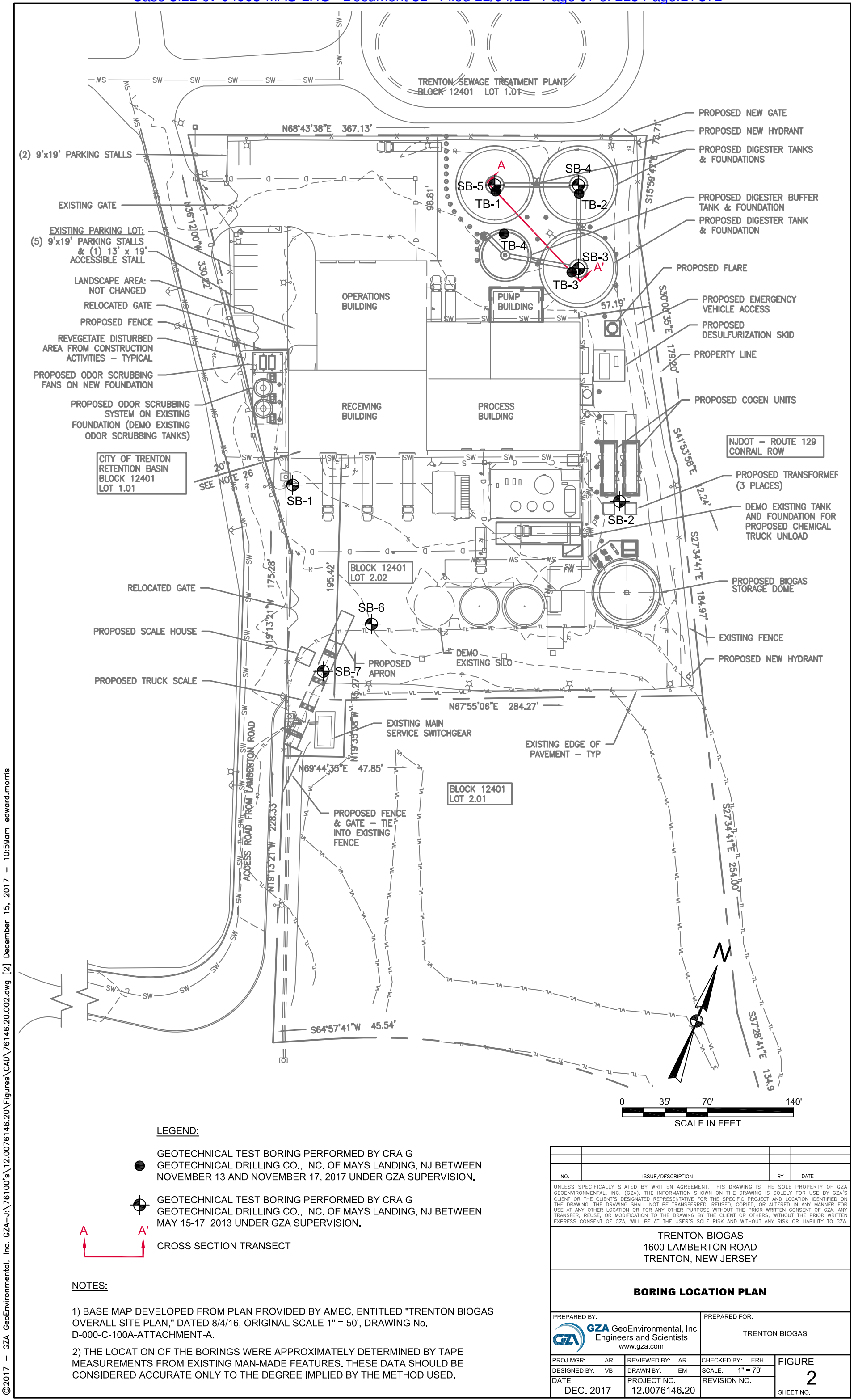
DEC. 2017

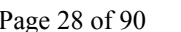
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FIGURE

1

SHEET NO.







APPENDIX A

LIMITATIONS



GEOTECHNICAL LIMITATIONS

Use of Report

1. GZA prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions .
3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

4. The generalized subsurface conditions provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.
5. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.
6. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.
7. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on



construction activities, or the use of structures on the property.

8. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

9. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Additional Services

10. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.



ATTACHMENT B

EXPLORATION LOGS

LOG KEY

GZA
Geo Environmental, Inc.
Engineers and Scientists

BURMISTER SOIL CLASSIFICATION (INORGANIC)

COMPONENT	NAME	PROPORTIONAL TERM	PERCENT BY WEIGHT	IDENTIFICATION OF FINES		
				Material	PI	Atterberg Thread Dia.
MAJOR	GRAVEL, SAND, FINES*		>50	SILT	0	Cannot Roll
Minor	Gravel, Sand, Fines*	and some little	35 - 50 20-35 10-20	Clayey SILT SILT & CLAY	1-5 5-10	1/4" 1/8"
*See identification of fines table.		trace	0-10	CLAY & SILT Silty CLAY CLAY	10-20 20-40 >40	1/16" 1/32" 1/64"

GRADATION DESIGNATION	PROPORTION OF COMPONENT	PLASTIC SOILS		GRAVEL & SAND	
		Consistency	Blows/Ft. SPT N-Value	Density	Blows/Ft. SPT N-Value
Fine to coarse	All fractions > 10%	Very Soft	< 2	Very Loose	< 4
Medium to coarse	<10% fine	Soft	2 - 4	Loose	4 - 10
Fine to medium	<10% coarse	Medium Stiff	4 - 8	Medium Dense	10 - 30
Coarse	<10% fine and medium	Stiff	8 - 15	Dense	30 - 50
Medium	<10% coarse and fine	Very Stiff	15 - 30	Very Dense	> 50
Fine	<10% coarse and medium	Hard	>30		

BURMISTER SOIL CLASSIFICATION (ORGANIC)

Fibrous PEAT (Pt) - Lightweight, spongy, mostly visible organic matter, water squeezes readily from sample. Typically near top of deposit.
 Fine Grained PEAT (Pt) - Lightweight, spongy, little visible organic matter, water squeezes readily from sample. Typically below fibrous peat.
 Organic Silt (OL) - Typically gray to dark gray, often has strong H₂S odor. Typically contains shells or shell fragments. Lightweight. Usually found near coastal regions. May contain wide range of sand fractions.
 Organic Clay (OH) - Typically gray to dark gray, high plasticity. Usually found near coastal regions. May contain wide range of sand fractions.
 Need organic content test for final identification.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS) (ASTM D 2487)

MAJOR DIVISIONS			Group Symbols	
Coarse Grained Soils More than 50% of material larger than No. 200 sieve.	Gravel More than 50% larger than No. 4 sieve.	Clean Gravels (Little or no fines)	GW	GP
		Gravels with Fines (Appreciable amount of fines)	GM	GC
	Sand More than 50% smaller than No. 4 sieve.	Clean Sands (Little or no fines)	SW	SP
		Sands with Fines (Appreciable amount of fines)	SM	SC
Fine Grained Soils More than 50% of material smaller than No. 200 sieve.	Silts and Clays Liquid Limit <50		ML	CL
			OL	MH
	Silts and Clays Liquid Limit >50		CH	OH
			Pt	
	Highly Organic Soils			

ABBREVIATIONS

MR = Mud Rotary	Tv = Field Vane Shear Test (Torvane)
HSA = Hollow Stem Auger	PP = Pocket Penetrometer
SSA = Solid Stem Auger	PI = Plasticity Index
SS = Split Spoon Sampler	MC = Moisture Content
U = Undisturbed Sample (Shelby Tube)	CO = Consolidation
MC = Modified California Sampler	UC = Unconfined Compression Test
V = Vibracore	SI = Sieve Analysis
M = Macrocore	DS = Direct Shear
	PID = Photoionization Detector
USCS = Unified Soil Classification System (ASTM D2487)	ppm = Parts Per Million
NYCBC = New York City Building Code	REC = Recovery
WOR = Weight of Rods	RQD = Rock Quality Designation
WOH = Weight of Hammer	▼ = Measured Water Level
SPT = Standard Penetration Test (ASTM D1586)	
N-Value = Cumulative number of uncorrected blows for the middle two six-inch intervals (blows/foot).	

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ

EXPLORATION NO.: SB-01
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 21
Final Boring Depth (ft.): 32
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/16/2013	02:30 PM		15.00	

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
5		S-1	0.0- 2.0	24	12	5 6 11 13	17	S-1: Medium dense, dark olive gray, medium SAND, some Silt and Gravel.					
		S-2	2.0- 4.0	24	22	26 19 14 14	33	S-2: Top 6": Medium, dense, light gray, coarse GRAVEL Bottom 16": Medium dense, olive brown, SAND, some Silt and Gravel.					
		S-3	4.0- 6.0	24	24	9 10 10 8	20	S-3: Top 12": Medium dense, light gray, GRAVEL Bottom 12": Medium dense, olive brown, SILT, some Sand, little Gravel.					
		S-4	6.0- 8.0	24	10	4 8 16 18	24	S-4: Medium, dense, black, medium to coarse SAND, some Silt, trace miscellaneous fill.					
		S-5	8.0- 10.0	24	18	4 10 8 6	18	S-5: Top 4": Medium dense, light orange and black, FILL materials, chipped stone					
10		S-6	10.0- 12.0	24	19	4 4 4 8	8	Bottom 14": Medium dense, tan and light gray, medium to coarse SAND. S-6: Loose, light brown, fine SAND, trace Silt.			10		11.0
		S-7	15.0- 17.0	24	5	12 8 4 4	12	S-7: Medium dense, dark gray, coarse SAND, some Gravel.					
20		S-8	20.0- 22.0	24	0	17 10 18 14	28	S-8: No recovery.			20		1.0
		S-9	25.0- 27.0	24	8	29 34 40 37	74	S-9: Very dense, mottled, red brown and yellow brown, GRAVEL, some coarse Sand.					
30													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-01

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON-MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ

EXPLORATION NO.: SB-01
SHEET: 2 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 21
Final Boring Depth (ft.): 32
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/16/2013	02:30 PM		15.00	

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-10	30.0- 32.0	24	6	14 20 18 16	38	S-10: Dense, mottled GRAVEL, some coarse Sand.				GRAVEL	
								End of exploration at 32 feet.			32		-11.0
35													
40													
45													
50													
55													
60													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-01

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TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ

EXPLORATION NO.: SB-02
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 20
Final Boring Depth (ft.): 32
Date Start - Finish: 5/15/2013 - 5/15/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/15/2013	11:00 AM		14.00	


Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-1	0.0-2.0	24	12	9	19	S-1: Drilled through asphalt			0.5	ASPHALT	19.5
						10 12		Medium dense, yellowish red, coarse SAND.					
		S-2	2.0-4.0	24	17	16 20	38	S-2: Dense, black, medium SAND, little Gravel.					
						18 11							
5		S-3	4.0-6.0	24	12	9 7	15	S-3: Medium dense, black, GRAVEL.					
						8 9							
		S-4	6.0-8.0	24	6	2 2	4	S-4: Loose, black, coarse SAND, some Gravel.			6		14.0
						2 2							
		S-5	8.0-10.0	24	10	1 2	3	S-5: Soft, blackish-olive, CLAY, high plasticity.	1		8		12.0
						1 2							
10		S-6	10.0-12.0	24	8	1 2	3	S-6: Soft, olive brown, CLAY, little Sand.					
						1 2							
											13		7.0
15		S-7	15.0-17.0	24	10	1 2	4	S-7: Loose, dark brown, SILT, little fine Sand.					
						2 2							
											18		2.0
20		S-8	20.0-22.0	24	7	2 2	5	S-8: Loose, dark brown, fine SAND, some Silt.					
						3 6							
											23		-3.0
25		S-9	25.0-27.0	24	18	22 29	69	S-9: Very dense, red-brown GRAVEL, some coarse Sand.					
						40 32							
30													

REMARKS
1 - Moderate odor noted.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-02

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TEST BORING LOG																													
 GZA GeoEnvironmental, Inc. <i>Engineers and Scientists</i>					Trenton BioGas, LLC 1600 Lamberton Road Trenton, NJ					EXPLORATION NO.: SB-02 SHEET: 2 of 2 PROJECT NO: 12.0076146.00 REVIEWED BY: A. Rizk																			
Logged By: V. Brumbaugh Drilling Co.: Craig Geotechnical Drilling Foreman: T. Ward					Type of Rig: Track Rig Model: CME Drilling Method: MR		Boring Location: See Plan Ground Surface Elev. (ft.): 20 Final Boring Depth (ft.): 32 Date Start - Finish: 5/15/2013 - 5/15/2013				H. Datum: N/A V. Datum: NGVD 29																		
Hammer Type: Automatic Hammer Hammer Weight (lb.): 140 Hammer Fall (in.): 30 Auger or Casing O.D./I.D Dia (in.): 4.25/4.0					Sampler Type: SS Sampler O.D. (in.): 2.0 Sampler Length (in.): 24 Rock Core Size: N/A			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="5" style="text-align: center;">Groundwater Depth (ft.)</th> </tr> <tr> <th style="width: 20%;">Date</th> <th style="width: 20%;">Time</th> <th style="width: 20%;">Stab. Time</th> <th style="width: 20%;">Water</th> <th style="width: 20%;">Casing</th> </tr> </thead> <tbody> <tr> <td>05/15/2013</td> <td>11:00 AM</td> <td></td> <td>14.00</td> <td></td> </tr> </tbody> </table>							Groundwater Depth (ft.)					Date	Time	Stab. Time	Water	Casing	05/15/2013	11:00 AM		14.00	
Groundwater Depth (ft.)																													
Date	Time	Stab. Time	Water	Casing																									
05/15/2013	11:00 AM		14.00																										
Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)				Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)													
		S-10	30.0-32.0	24	12	21 38 32 19	70	S-10: Very dense, yellow-brown, GRAVEL, some coarse Sand.							GRAVEL	32	-12.0												
								End of exploration at 32 feet.																					
35																													
40																													
45																													
50																													
55																													
60																													
REMARKS																													
See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.															Exploration No.: SB-02														

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON-MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lambertson Road
Trenton, NJ

EXPLORATION NO.: SB-03
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 19
Final Boring Depth (ft.): 32
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/16/2013	08:30 AM		15.00	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
5		S-1	0.0-2.0	24	12	3 5 7 9	12	S-1: Medium dense, dark brown, fine SAND and GRAVEL, some fill debris.					
		S-2	2.0-4.0	24	24	13 14 14 14	28	S-2: Medium dense, black, SAND, some Gravel, some Silt.	1			FILL	
		S-3	4.0-6.0	24	18	9 10 10 14	20	S-3: Medium dense, dark brown, medium SAND, trace wood fragments.			6		13.0
		S-4	6.0-8.0	24	16	34 30 19 27	49	S-4: Dense, dark gray, brown, medium SAND, trace wood fragments.			8.3	GRAVEL	10.7
10		S-5	8.0-10.0	24	10	26 6 6 4	12	S-5: Top 4": Dense, dark gray, coarse GRAVEL, some coarse Sand			10	SAND	9.0
		S-6	10.0-12.0	24	20	2 3 2 3	5	Bottom 6": Medium dense, dark brown, medium SAND, some Silt. S-6: Loose, mottled, yellow, green and black CLAY, very high plasticity.	2		13	ORGANIC CLAY	6.0
15		S-7	15.0-17.0	24	10	6 5 4 5	9	S-7: Loose, black, medium to coarse SAND.	3				
20		S-8	20.0-22.0	24	8	2 4 5 4	9	S-8: Loose, dark brown, fine SAND, some Silt.			23		-4.0
25		S-9	25.0-27.0	24	12	16 17 26 30	43	S-9: Dense, red-yellow, coarse SAND and GRAVEL.				SAND AND GRAVEL	
30											30		-11.0

REMARKS

- 1 - Moderate odor noted.
2 - Slight odor noted.
3 - Strong odor noted.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-03

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON-MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ

EXPLORATION NO.: SB-03
SHEET: 2 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 19
Final Boring Depth (ft.): 32
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/16/2013	08:30 AM		15.00	

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-10	30.0- 32.0	24	6	16 18 13 16	31	S-10: Dense, red-brown, coarse GRAVEL.				GRAVEL	
								End of exploration at 32 feet.			32		-13.0
35													
40													
45													
50													
55													
60													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-03

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON-MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ

EXPLORATION NO.: SB-04
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.3
Final Boring Depth (ft.): 32
Date Start - Finish: 5/15/2013 - 5/15/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/15/2013	02:30 PM		20.00	

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-1	0.0-1.5	18	18	5 3	8	S-1: Drilled through Asphalt Loose, black, fine to medium SAND, some Gravel.			0.5	ASPHALT	17.8
		S-2	2.0-3.9	23	16	5 4 8 50/5"	12	S-2: Top 12": Concrete and miscellaneous FILL Bottom 12" Medium dense, black, fine SAND, some Silt.				FILL	
5		S-3	4.0-4.2	2	2	60/1"		S-3: Concrete debris.					
		S-3a	5.0-5.8	10	10	20 50/4"	R	S-3a: Very dense, black, fine to medium SAND, some Silty Clay, some Gravel.					
		S-4	6.0-6.0	24	24	10 9 10 14	19	S-4: Top 12": Medium dense, black, coarse GRAVEL Bottom 12": Medium dense, olive brown, SILT and fine to medium Sand.			7		11.3
		S-5	8.0-8.0	24	8	12 10 4 2	14	S-5: Top 4": Medium dense, gray, medium SAND, some Silt			8	SILT	10.3
10		S-6	10.0-12.0	24	0	2 2 2 3	4	S-6: No recovery in Shelby tube or subsequent Split Spoon sample attempt.			8.3	SAND	10.0
15		S-7	15.0-17.0	24	16	2 5 5 7	10	S-7: Stiff, black, organic CLAY.	1			ORGANIC CLAY	
20		S-8	20.0-22.0	24	8	5 2 3 3	5	S-8: Medium stiff, brown, organic SILT & CLAY.					
25		S-9	25.0-27.0	24	6	10 14 21 30	35	S-9: Dense, red-yellow, mottled, coarse SAND and GRAVEL.			23		-4.7
30											28	SAND AND GRAVEL	
												CLAY	-9.7

REMARKS
1 - Moderate CLAY.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-04

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON-MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ

EXPLORATION NO.: SB-04
SHEET: 2 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.3
Final Boring Depth (ft.): 32
Date Start - Finish: 5/15/2013 - 5/15/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/15/2013	02:30 PM		20.00	

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-10	30.0- 32.0	24	14	8 28 15 15	43	S-10: Hard, light gray, CLAY and SILT with yellow, fine Sand seams.				CLAY	
								End of exploration at 32 feet.			32		-13.7
35													
40													
45													
50													
55													
60													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-04

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON-MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lambertson Road
Trenton, NJ

EXPLORATION NO.: SB-05
SHEET: 1 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.5
Final Boring Depth (ft.): 47
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/16/2013	08:30 AM		15.00	

Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
5		S-1	0.0-2.0	24	14	5 3 8 5	11	S-1: Medium dense, olive brown, SILT, some fine to medium Sand, little Gravel.					
		S-2	2.0-4.0	24	24	7 5 17 12	22	S-2: Medium dense, dark brown, SILT, some fine to medium Sand, little Gravel.				FILL	
		S-3	4.0-6.0	24	20	10 8 6 6	14	S-3: Top 6": Medium dense, olive-brown, SILT, some fine to medium Sand, little Gravel			4.5		14.0
		S-4	6.0-8.0	24	18	4 4 3 3	7	Bottom 14": Medium dense, black, fine to medium SAND and GRAVEL.	1		6	SAND AND GRAVEL	12.5
10		S-5	8.0-10.0	24	24	3 4 3 4	7	S-4: Loose, black, SILT.	1			SILT	
		S-6	10.0-12.0	24	24	1 1 1 2	2	S-5: Loose, black, SILT, some medium Sand.	1		10		8.5
								S-6: Soft, black, Clayey SILT.	2				
15		S-7	15.0-17.0	24	20	2 2 2 2	4	S-7: Soft, black, CLAY with black, medium to coarse Sand seams.	1		18	ORGANIC CLAY/SILT	0.5
20		S-8	20.0-22.0	24	10	2 4 3 4	7	S-8: No recovery.			22	SILT/SAND	-3.5
25		S-9	25.0-27.0	24	1	15 18 30 35	48	S-9: Very dense, red-yellow, coarse GRAVEL, some coarse Sand.				GRAVEL	
30													

REMARKS
1 - Moderate odors.
2 - Strong odor.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-05

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON - MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lamberton Road
Trenton, NJ

EXPLORATION NO.: SB-05
SHEET: 2 of 2
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.5
Final Boring Depth (ft.): 47
Date Start - Finish: 5/16/2013 - 5/16/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/16/2013	08:30 AM		15.00	

Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
35		S-10	30.0-32.0	24	19	12 10 12 14	22	S-10: Medium dense, mottled GRAVEL.			32	GRAVEL	-13.5
40		S-11	35.0-37.0	24	24	5 8 10 16	18	S-11: Very stiff, gray CLAY.		PP = 1.0			
45		S-12	40.0-42.0	24	24	5 9 10 12	19	S-12: Very stiff, gray, CLAY.		PP = 2.25 TV = 2.5		CLAY	
50		S-13	45.0-47.0	24	24	7 10 12 18	22	S-13: Very stiff, gray, CLAY with yellow, Sand seams.		PP = 4.5 TV = 3.5	47		-28.5
55								End of exploration at 47 feet.					
60													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-05

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON-MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lambertson Road
Trenton, NJ

EXPLORATION NO.: SB-06
SHEET: 1 of 1
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 20
Final Boring Depth (ft.): 26.8
Date Start - Finish: 5/17/2013 - 5/17/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/17/2013	08:30 AM		15.00	

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
5		S-1	0.0- 2.0	24	19	8 8 10	16	S-1: Drilled through Asphalt Medium dense, dark brown, SILT, little medium Sand.			0.5	ASPHALT	19.5
		S-2	2.0- 4.0	24	24	11 6 7 5	13	S-2: Medium dense, dark brown, SILT, some medium Sand, trace Gravel.					
		S-3	4.0- 6.0	24	12	4 2 2 1	4	S-3: Soft, brown, organic SILT, little Sand, some fill and woodchips.	1				
		S-4	6.0- 8.0	24	12	1 1 1 1	2	S-4: Soft, black, CLAY.			6		14.0
		S-5	8.0- 10.0	24	22	WH 1 2 2	3	S-5: Soft, mottled, olive green and black, Clayey SILT, trace fine Sand and woodchips.	1				
15		S-6	15.0- 17.0	24	18	1 1 1 9	2	S-6: Soft, gray, Clayey SILT and fine Sand.					
		S-7	20.0- 22.0	24	2	3 6 11 16	17	S-7: Medium dense, brown, GRAVEL, some Sand, trace Silt.			18		2.0
25		S-8	25.0- 26.8	21	20	35 35 49 50/3"	84	S-8: Very dense, mottled, coarse GRAVEL, some coarse Sand.			26.8		-6.8
								End of exploration at 26.8 feet.					

REMARKS
1 - Slight odor noted.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-06

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON - MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton BioGas, LLC
1600 Lambertson Road
Trenton, NJ

EXPLORATION NO.: SB-07
SHEET: 1 of 1
PROJECT NO: 12.0076146.00
REVIEWED BY: A. Rizk

Logged By: V. Brumbaugh
Drilling Co.: Craig Geotechnical Drilling
Foreman: T. Ward

Type of Rig: Track
Rig Model: CME
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 19.5
Final Boring Depth (ft.): 26.8
Date Start - Finish: 5/17/2013 - 5/17/2013

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.25/4.0

Sampler Type: SS
Sampler O.D. (in.): 2.0
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
05/17/2013	09:30 AM		15.00	

Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-1	0.0-1.5	18	12	7 9 13	16	S-1: Drilled through Asphalt Medium dense, dark olive/brown, SILT, some coarse Sand, little Gravel.	1		0.5	ASPHALT	19.0
		S-2	2.0-4.0	24	8	8 4 5 3	9	S-2: Loose, dark olive-brown, SILT, little medium to coarse Sand and Gravel.			4	FILL	15.5
5		S-3	4.0-6.0	24	24	2 1 1 4	2	S-3: Top 18": Soft, olive-brown, SILT & CLAY Bottom 6": Soft, black, CLAY.	2				
		S-4	6.0-8.0	24	4	WH WH WH WH	0	S-4: Very soft, black, CLAY and coarse SAND.	2				
10		S-5	8.0-10.0	24	24	1 1 1 1	2	S-5: Soft, black, mottled, olive-green, Silty CLAY.	1				ORGANIC CLAY
		S-6	15.0-17.0	24	18	1 1 WH 4	1	S-6: Very loose, gray-brown, medium to coarse SAND.			13		6.5
15													
20		S-7	20.0-22.0	24	18	2 5 2 3	7	S-7: Loose, brown, SAND, little Silt.	1				
25		S-8	25.0-26.8	22	6	34 20 42 50/4"	62	S-8: Very dense, dark red-brown, GRAVEL, some coarse Sand.			23		-3.5
30								End of exploration at 26.8 feet.			26.8		-7.3

REMARKS
1 - Slight odors.
2 - Strong odors.
3 - Oil sheen observed/strong odors.

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
SB-07

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 12/19/17 09:39 - J:\GINT PROJECT DATABASES\NON - MANHATTAN\12 - NNJ12.0076146.00.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-1
SHEET: 1 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.6
Final Boring Depth (ft.): 122
Date Start - Finish: 11/16/2017 - 11/17/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/17/2017	07:15 AM	-1051 min	17.70	30.00

Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-1	0.5-2.5	24	18	9 8 13 13	21	S-1: Medium dense, dark brown to black, fine to medium SAND, some Silt, little Gravel, trace Brick fragments.	1		0.3	ASPHALT	18.3
		S-2	2.5-4.5	24	20	12 7 10 21	17	S-2: Medium dense, dark brown to black, fine to medium SAND, some Silt, little Gravel, trace Brick fragments, trace Glass fragments.			4.5	FILL	14.1
5		S-3	4.5-6.5	24	10	6 7 9 8	16	S-3: Medium dense, brown, fine to medium SAND, little Silt, trace Gravel.					
		S-4	6.5-8.5	24	3	11 7 4 7	11	S-4: Medium dense, brown, fine to medium SAND, and Gravel, trace Silt.					
10		S-5	8.5-10.5	24	0	7 6 6 7	12	S-5: No Recovery.					
		S-6	10.5-12.5	24	1	9 7 4 4	11	S-6: Medium dense, brown, fine to medium SAND, and Gravel, trace Silt.			13		5.6
15		S-7	15.0-17.0	24	18	1 WH WH 2	0	S-7: Very soft, brown, Organic SILT & CLAY.	PP = 0.5 TV = 0.2		18	ORGANIC SILT	0.6
20		S-8	20.0-22.0	24	12	1 1 1 2	2	S-8: Very loose, brown, fine to medium SAND, some Silt.			23	SAND	-4.4
25		S-9	25.0-27.0	24	10	9 12 20 25	32	S-9: Dense, brown, fine to coarse GRAVEL, little Sand.	2			GRAVEL	
30													

REMARKS

- 1 - Drill through asphalt surface cover to 0.5ft bgs
- 2 - Rig chatter from approximately 27ft to 35ft bgs

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-1

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFARFIELD\PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-1
SHEET: 2 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.6
Final Boring Depth (ft.): 122
Date Start - Finish: 11/16/2017 - 11/17/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/17/2017	07:15 AM	-1051 min	17.70	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample						SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)								
35		S-10	30.0- 32.0	24	6	20 16 14 13		30	S-10: Medium dense, brown, fine to coarse GRAVEL, little Sand.					
		S-11	35.0- 37.0	24	4	5 7 9 6		16	S-11: Medium dense, brown, fine to coarse GRAVEL, little Sand.	3				
40		S-12	40.0- 42.0	24	20	5 5 7 10		12	S-12: Stiff, brown, SILTY CLAY, trace Sand.	4	PP = 2.25 TV = 0.5			
45		U-1	45.0- 47.0	24	24				U-1: Stiff, brown, Silty CLAY.					
50		S-13	47.0- 49.0	24	24	5 5 9 17		14	S-13: Medium dense, light brown to tan, SILT, varved Clay, trace Sand.					
55		S-14	50.0- 52.0	24	24	7 21 16 25		37	S-14: Top 8": Dense, tan to white SILT, trace Sand. Bottom 6": Tan to white, fine to medium SAND, little Silt.					
60		S-15	55.0- 57.0	24	12	21 21 22 25		43	S-15: Dense, tan to white, fine to medium SAND, little Silt.					

REMARKS
3 - Sample collected using 3" spoon
4 - Advance 4" casing to 40ft bgs

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-1

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFARFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-1
SHEET: 3 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.6
Final Boring Depth (ft.): 122
Date Start - Finish: 11/16/2017 - 11/17/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/17/2017	07:15 AM	-1051 min	17.70	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
65		S-16	60.0- 62.0	24	12	12 15 18 23	33	S-16: Dense, tan to brown, fine to coarse SAND, trace Gravel, trace Silt.				SAND	
65		S-17	65.0- 67.0	24	15	17 28 32 34	60	S-17: Very dense, tan to brown, fine to coarse SAND, trace Silt.			68		-49.4
70		S-18	70.0- 72.0	24	13	12 12 16 21	28	S-18: Medium dense, white SILT.			73	SILT	-54.4
75		S-19	75.0- 77.0	24	18	16 17 20 20	37	S-19: Dense, tan, fine to medium SAND, trace Silt.					
80		S-20	80.0- 82.0	24	20	30 35 47 39	82	S-20: Very dense, tan, fine to coarse SAND, trace Silt.				SAND	
85		S-21	85.0- 87.0	24	15	19 26 24 22	50	S-21: Dense, tan, fine to coarse SAND, trace Gravel, trace Silt.			88		-69.4
90												CLAY	

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-1

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-1
SHEET: 4 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.6
Final Boring Depth (ft.): 122
Date Start - Finish: 11/16/2017 - 11/17/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/17/2017	07:15 AM	-1051 min	17.70	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
95		S-22	90.0-92.0	24	18	8 14 20 22	34	S-22: Hard, white, SILT & CLAY, trace Sand. Bottom 12": Tan, fine to coarse SAND, trace Silt.		PP = 2.5	90.5		-71.9
		S-23	95.0-97.0	24	13	20 23 30 25	53	S-23: Very dense, tan, fine to medium SAND, trace Silt.					
100		S-24	100.0-102.0	24	10	21 27 26 34	53	S-24: Very dense, brown, fine to coarse SAND, trace Silt.					
105		S-25	105.0-107.0	24	18	22 14 8 10	22	S-25: Medium dense, tan, fine to coarse SAND, trace Gravel, trace Silt. Bottom 6": White fine to medium SAND and Clayey SILT.				SAND	
110		S-26	110.0-112.0	24	15	20 19 22 19	41	S-26: Dense, white, fine to medium SAND, little Silt.					
115		S-27	115.0-117.0	24	18	24 32 36 31	68	S-27: Very dense, white to brown, fine to coarse SAND, little Silt, trace Gravel.					
120													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-1

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-1
SHEET: 5 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.6
Final Boring Depth (ft.): 122
Date Start - Finish: 11/16/2017 - 11/17/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/17/2017	07:15 AM	-1051 min	17.70	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
		S-28	120.0- 122.0	24	10	17 24 32 30	56	S-28: Very dense, tan, fine to coarse SAND, trace Silt.				SAND	
								End of exploration at 122 feet.	5		122		-103.4
125													
130													
135													
140													
145													
150													

REMARKS
5 - Borehole backfilled with grout

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-1

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFAR\FIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambertson Road

EXPLORATION NO.: TB-2
SHEET: 1 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.3
Final Boring Depth (ft.): 122
Date Start - Finish: 11/14/2017 - 11/15/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/15/2017	07:15 AM	-1050 min	14.60	30.00

Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-1	0.5-2.5	24	13	6 5 6 8	11	S-1: Medium dense, dark brown, fine to medium SAND, some Silt, trace Brick fragments, trace Asphalt.	1		0.3	ASPHALT	18.0
5		S-2	2.5-4.5	24	20	9 12 19 14	31	S-2: Dense, dark brown, fine to medium SAND, little Silt, trace Gravel, trace Brick fragments, trace trash debris.				FILL	
		S-3	4.5-6.5	24	13	7 18 24 28	42	S-3: Dense, dark brown to black, fine to medium SAND, some Silt, trace Gravel, trace Brick fragments.					
		S-4	6.5-8.5	24	16	22 3 3 3	6	S-4: Loose, dark brown, fine to medium SAND, some Silt, some Gravel.			6.8		11.5
		S-5	8.5-10.5	24	15	1 1 1 4	2	Bottom 12": Brown Silt, trace Peat.			8.5	ORGANIC SILT	9.8
10		S-6	10.5-12.5	24	8	2 2 2 2	4	S-5: Very loose, dark brown to black, amorphous PEAT.					
		U-1	12.5-14.5	24	0			S-6: Loose, dark brown, amorphous PEAT, little Silt & Clay.					
15								U-1: No Recovery.					
		S-7	15.0-17.0	24	20	1 WH 1 2	1	S-7: Very loose, dark brown, amorphous PEAT.					
		U-2	17.0-19.0	24	15			U-2: Dark brown to black, amorphous PEAT.					
20		S-8	19.0-21.0	24	2	6 3 1 2	4	S-8: Very loose, black, fine to medium SAND and SILT.			19		-0.7
												SAND AND SILT	
25		S-9	25.0-27.0	24	15	4 18 31 27	49	S-9: Dense, brown, fine to medium SAND, trace Silt.	2		25.3		-7.0
								Bottom 12": Fine to coarse GRAVEL, little Sand.					
30											29	GRAVEL	-10.7
												CLAY	

REMARKS
1 - Drill through asphalt surface cover to 0.5ft bgs
2 - Rig chatter from approximately 26ft to 29ft bgs
3 - Advance 4" casing to 30ft bgs

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-2

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFARFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-2
SHEET: 2 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.3
Final Boring Depth (ft.): 122
Date Start - Finish: 11/14/2017 - 11/15/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/15/2017	07:15 AM	-1050 min	14.60	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
35		S-10	30.0- 32.0	24	12	4 4 3 4	7	S-10: Loose, brown, Silty CLAY.	3				
		S-11	35.0- 37.0	24	22	2 6 8 13	14	S-11: Medium dense, brown, SILT, varved Clay.					
40		S-12	40.0- 42.0	24	20	3 5 6 9	11	S-12: Medium dense, brown, SILT, varved Clay.					
45		S-13	45.0- 47.0	24	24	5 13 15 23	28	S-13: Medium dense, light brown to tan, SILT, varved Clay, Sand seams (10-11" and 20-22").					
50		S-14	50.0- 52.0	24	24	11 17 25 41	42	S-14: Dense, tan, fine to medium SAND, trace Silt, 12-20": Tan to white SILT.					
55		S-15	55.0- 57.0	24	18	19 24 27 41	51	S-15: Very dense, tan, fine to coarse SAND, trace Silt, 12-15": Tan to white SILT.					
60													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-2

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-2
SHEET: 3 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.3
Final Boring Depth (ft.): 122
Date Start - Finish: 11/14/2017 - 11/15/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/15/2017	07:15 AM	-1050 min	14.60	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
65		S-16	60.0- 62.0	24	24	38 43 58 53	>100	S-16: Very dense, tan, fine to medium SAND, trace Silt.					
		S-17	65.0- 67.0	24	15	22 23 28 27	51	S-17: Very dense, tan, fine to medium SAND, trace Silt.					
70		S-18	70.0- 72.0	24	13	20 26 32 30	58	S-18: Very dense, tan, fine to coarse SAND, trace Silt.					
75		S-19	75.0- 77.0	24	10	15 19 17 15	36	S-19: Dense, tan, fine to coarse SAND, trace Silt.				SAND	
80		S-20	80.0- 82.0	24	12	19 26 27 30	53	S-20: Very dense, white, fine to medium SAND, trace Silt.					
85		S-21	85.0- 87.0	24	14	16 21 26 27	47	S-21: Dense, brown, fine to coarse SAND, little Gravel, trace Silt.					
90													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-2

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-2
SHEET: 4 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.3
Final Boring Depth (ft.): 122
Date Start - Finish: 11/14/2017 - 11/15/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/15/2017	07:15 AM	-1050 min	14.60	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
95		S-22	90.0-92.0	24	13	18 20 23 19	43	S-22: Dense, tan, fine to coarse SAND, some Gravel.			93	SAND	-74.7
		S-23	95.0-97.0	24	20	8 12 15 24	27	S-23: Medium dense, light gray to white, SILT.	4		98	SILT	-79.7
100		S-24	100.0-102.0	24	10	20 20 28 28	48	S-24: Dense, tan, fine to coarse SAND, little Gravel, trace Silt.					
105		S-25	105.0-107.0	24	12	17 20 25 21	45	S-25: Dense, tan to white, fine to medium SAND, little Silt.					
110		S-26	110.0-112.0	24	20	20 32 39 34	71	S-26: Very dense, white, fine to medium SAND, little Silt.					
115		S-27	115.0-117.0	24	13	8 12 25 27	37	S-27: Dense, light gray to white, fine to medium SAND, trace Silt.					
120													

REMARKS 4 - Borehole collapsed at approximately 70ft bgs

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-2

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-2
SHEET: 5 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.3
Final Boring Depth (ft.): 122
Date Start - Finish: 11/14/2017 - 11/15/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/15/2017	07:15 AM	-1050 min	14.60	30.00

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-28	120.0- 122.0	24	12	14 20 27 24	47	S-28: Dense, white, fine to coarse SAND, trace Silt.				SAND	
								End of exploration at 122 feet.	5		122		-103.7

REMARKS
5 - Borehole backfilled with grout

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-2

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFAR\FIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-3
SHEET: 1 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 19.1
Final Boring Depth (ft.): 122
Date Start - Finish: 11/13/2017 - 11/14/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/14/2017	07:05 AM	-1025 min	16.00	35.00

Depth (ft)	Casing Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		S-1	0.5-2.5	24	15	5 5 12 7	17	S-1: Medium dense, dark brown to black, fine to medium SAND, some Silt, trace Brick fragments, trace Asphalt.	1		0.3	ASPHALT	18.8
		S-2	2.5-4.5	24	18	10 8 10 10	18	S-2: Medium dense, dark brown to black, fine to medium SAND, some Silt, trace Gravel, trace Brick fragments, trace wood.	2		4.5	FILL	14.6
5		S-3	4.5-6.5	24	6	33 17 13 14	30	S-3: Medium dense, brown, fine to medium SAND, some Silt, little Gravel.					
		S-4	6.5-8.5	24	12	9 11 10 12	21	S-4: Medium dense, brown, fine and coarse SAND, some Silt, trace Gravel.					
10		S-5	8.5-10.5	24	6	4 3 2 2	5	S-5: Loose, brown, fine to coarse SAND, some Silt, little Gravel.					
		S-6	10.5-12.5	24	4	7 11 30 21	41	S-6: Brown with gray, fine to medium, SAND and SILT.					
15		S-7	15.0-17.0	24	20	1 2 3 3	5	S-7: Loose, black, ORGANIC SILT, little Sand.	PP = 1.0		14	ORGANIC SILT	5.1
		S-8	20.0-22.0	24	18	WH WH WH 1	0	S-8: Top 6": Very loose, black to dark brown PEAT. Bottom 12": Dark brown, fine to medium SAND, some Silt.			18	PEAT	1.1
20											20.5	SAND AND SILT	-1.4
25		S-9	25.0-27.0	24	3	7 12 17 25	29	S-9: Medium dense, brown, fine to coarse GRAVEL, trace Sand.	3		23	GRAVEL	-3.9
30													

REMARKS
1 - Drill through asphalt surface cover to 0.5ft bgs
2 - Petroleum like odor
3 - Rig chatter from approximately 27 to 35 feet bgs

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-3

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-3
SHEET: 2 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 19.1
Final Boring Depth (ft.): 122
Date Start - Finish: 11/13/2017 - 11/14/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/14/2017	07:05 AM	-1025 min	16.00	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
35		S-10	30.0-32.0	24	6	4 22 26 27	48	S-10: Dense, brown, coarse GRAVEL, trace Sand.				GRAVEL	
		S-11	35.0-37.0	24	0	4 6 8 12	14	S-11: No Recovery.	4		35		-15.9
40		S-12	40.0-42.0	24	20	5 4 9 12	13	S-12: Stiff, white, SILT & CLAY, little Sand.		PP = 2.0 TV = 0.4		CLAY	
45		S-13	45.0-47.0	24	22	7 12 16 29	28	S-13: Very stiff, white, SILTY CLAY, trace SAND. Bottom 6": Light brown to orange, fine to medium SAND, little Silt.		PP = 2.5 TV = 0.45	46.5		-27.4
50		S-14	50.0-52.0	24	18	14 22 22 25	44	S-14: Dense, white, fine to medium SAND, trace Silt.				SAND	
55		S-15	55.0-57.0	24	20	7 11 18 36	29	S-15: Medium dense, white, fine to medium SAND, trace Silt. Bottom 12": White SILT.			56		-36.9
											58	SILT	-38.9
60												SAND	

REMARKS
4 - Advance 4" casing to 35ft bgs
5 - Silty Clay observed on wall of split spoon

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-3

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\N\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-3
SHEET: 3 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 19.1
Final Boring Depth (ft.): 122
Date Start - Finish: 11/13/2017 - 11/14/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/14/2017	07:05 AM	-1025 min	16.00	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
65		S-16	60.0- 62.0	24	15	11 34 47 63	81	S-16: Very dense, white to light brown, fine to medium SAND, trace Silt.				SAND	
		S-17	65.0- 67.0	24	24	7 18 22 36	40	S-17: Dense, white to light gray, fine to medium SAND, trace Silt. Bottom 12": Whitish brown, SILT, trace Sand, varved Clay.			66		-46.9
		S-18	70.0- 72.0	24	12	14 13 16 18	29	S-18: Medium dense, tan, fine to coarse SAND, trace Silt.			68	SILT	-48.9
75		S-19	75.0- 77.0	24	12	19 28 29 24	57	S-19: Very dense, white-brown, fine to medium SAND, trace Silt.					
80		S-20	80.0- 82.0	24	15	16 20 24 28	44	S-20: Dense, tan, fine to coarse SAND, trace Silt.				SAND	
85		S-21	85.0- 87.0	24	10	7 7 11 18	18	S-21: Medium dense, orange-brown, fine to coarse SAND, trace Silt.					
90													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-3

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-3
SHEET: 4 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 19.1
Final Boring Depth (ft.): 122
Date Start - Finish: 11/13/2017 - 11/14/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/14/2017	07:05 AM	-1025 min	16.00	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
95		S-22	90.0- 92.0	24	15	19 30 43 46	73	S-22: Very dense, tan, fine to coarse SAND, trace Silt.					
		S-23	95.0- 97.0	24	24	40 56 55 66	>100	S-23: Very dense, tan to light gray, fine to coarse SAND, trace Silt.					
100		S-24	100.0- 102.0	24	16	18 26 34 28	60	S-24: Very dense, tan, fine to coarse SAND, little Silt.					
105		S-25	105.0- 107.0	24	18	22 28 28 38	56	S-25: Very dense, tan, fine to medium SAND, little Silt.				SAND	
110		S-26	110.0- 112.0	24	24	16 47 62 87	>100	S-26: Very dense, tan to light gray, fine to medium SAND, little Silt.					
115		S-27	115.0- 117.0	24	20	24 30 42 50	72	S-27: Very dense, tan to light gray, fine to coarse SAND, trace Silt.					
120													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-3

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFARFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
 Engineers and Scientists

Trenton Biogas
 Trenton, New Jersey
 1600 Lambert Road

EXPLORATION NO.: TB-3
 SHEET: 5 of 5
 PROJECT NO: 12.0076146.20
 REVIEWED BY: A. Rizk

Logged By: J. Poppe
 Drilling Co.: Craig Geotechnical Drilling Inc.
 Foreman: P. Mullins

Type of Rig: ATV
 Rig Model: CME 750X
 Drilling Method: MR

Boring Location: See Plan
 Ground Surface Elev. (ft.): 19.1
 Final Boring Depth (ft.): 122
 Date Start - Finish: 11/13/2017 - 11/14/2017

H. Datum: N/A
 V. Datum: NGVD 29

Hammer Type: Automatic hammer
 Hammer Weight (lb.): 140
 Hammer Fall (in.): 30
 Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
 Sampler O.D. (in.): 2
 Sampler Length (in.): 24
 Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/14/2017	07:05 AM	-1025 min	16.00	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value						
		S-28	120.0- 122.0	24	15	25 41 53 54	94	S-28: Very dense, light gray to white, fine to medium SAND, little Silt.					
								End of exploration at 122 feet.	6		122		-102.9
125													
130													
135													
140													
145													
150													

REMARKS
 6 - Borehole backfilled with grout, surface patched with asphalt

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
 TB-3

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFAR\FIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ



Trenton Biogas
Trenton, New Jersey
1600 Lamberton Road

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.7
Final Boring Depth (ft.): 122
Date Start - Finish: 11/15/2017 - 11/16/2017

H. Datum: N/A

V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/16/2017	07:15 AM	-1051 min	17.30	35.00

2 - Slight petroleum-like odor
3 - Rig chatter from approximately 27ft to 35ft bgs

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Page 61 of 90

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-4
SHEET: 2 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.7
Final Boring Depth (ft.): 122
Date Start - Finish: 11/15/2017 - 11/16/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/16/2017	07:15 AM	-1051 min	17.30	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
35		S-10	30.0-32.0	24	5	8 19 18 14	37	S-10: Dense, brown, fine to coarse GRAVEL, trace Sand.					
		S-11	35.0-37.0	24	3	8 6 9 4	15	S-11: Medium dense, brown, fine to coarse SAND and GRAVEL.	4				
40		S-12	40.0-42.0	24	21	4 5 7 10	12	S-12: Medium dense, brown, SILT, varved Clay, trace Sand.		PP = 3.0			
45		S-13	45.0-47.0	24	8	3 5 8 10	13	S-13: Medium dense, light brown, SILT, varved Clay.					
50		S-14	50.0-52.0	24	18	6 9 19 27	28	S-14: Top 12": Medium dense, light brown, SILT. Bottom 6": Tan, fine to medium SAND, little Silt.					
55		S-15	55.0-57.0	24	13	30 28 32 28	60	S-15: Very dense, tan to white, fine to medium SAND, trace Silt.					
60													

REMARKS

4 - Advance 4" casing to 35ft bgs

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-4

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFARFIELD\NJOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-4
SHEET: 3 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.7
Final Boring Depth (ft.): 122
Date Start - Finish: 11/15/2017 - 11/16/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/16/2017	07:15 AM	-1051 min	17.30	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
65		S-16	60.0- 62.0	24	12	29 30 41 38	71	S-16: Very dense, tan to white, fine to medium SAND, trace Silt.					
		S-17	65.0- 67.0	24	15	16 25 39 37	64	S-17: Very dense, tan to brown, fine to coarse SAND, trace Gravel, trace Silt.					
70		S-18	70.0- 72.0	24	18	20 31 49 63	80	S-18: Very dense, tan to brown, fine to coarse SAND, trace Gravel, trace Silt.					
75		S-19	75.0- 77.0	24	12	23 23 24 41	47	S-19: Dense, tan to white, fine to medium SAND, little Silt, trace Gravel.				SAND	
80		S-20	80.0- 82.0	24	8	11 16 35 41	51	S-20: Very dense, orange-brown, fine to coarse SAND, little Gravel, trace Silt.					
85		S-21	85.0- 87.0	24	15	23 32 37 25	69	S-21: Very dense, tan, fine to medium SAND, trace Silt.					
90													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-4

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\N\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-4
SHEET: 4 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.7
Final Boring Depth (ft.): 122
Date Start - Finish: 11/15/2017 - 11/16/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/16/2017	07:15 AM	-1051 min	17.30	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample					SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
95		S-22	90.0- 92.0	24	10	16 24 33 32	57	S-22: Very dense, tan, fine to coarse SAND, trace Silt.					
		S-23	95.0- 97.0	24	13	31 47 46 36	93	S-23: Very dense, tan, fine to coarse SAND, trace Gravel, trace Silt.					
100		S-24	100.0- 102.0	24	15	13 26 49 51	75	S-24: Very dense, fine to coarse SAND, little Silt.					
105		S-25	105.0- 107.0	24	20	15 19 24 20	43	S-25: Dense, tan to white, fine to medium SAND, some clayey Silt.				SAND	
110		S-26	110.0- 112.0	24	12	16 16 22 26	38	S-26: Dense, tan to white, fine to coarse SAND, some clayey Silt.					
115		S-27	115.0- 117.0	24	12	12 25 37 34	62	S-27: Very dense, white, fine to coarse SAND, little clayey Silt.					
120													

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-4

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAF\AIRFIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ

TEST BORING LOG



GZA
GeoEnvironmental, Inc.
Engineers and Scientists

Trenton Biogas
Trenton, New Jersey
1600 Lambert Road

EXPLORATION NO.: TB-4
SHEET: 5 of 5
PROJECT NO: 12.0076146.20
REVIEWED BY: A. Rizk

Logged By: J. Poppe
Drilling Co.: Craig Geotechnical Drilling Inc.
Foreman: P. Mullins

Type of Rig: ATV
Rig Model: CME 750X
Drilling Method: MR

Boring Location: See Plan
Ground Surface Elev. (ft.): 18.7
Final Boring Depth (ft.): 122
Date Start - Finish: 11/15/2017 - 11/16/2017

H. Datum: N/A
V. Datum: NGVD 29

Hammer Type: Automatic Hammer
Hammer Weight (lb.): 140
Hammer Fall (in.): 30
Auger or Casing O.D./I.D Dia (in.): 4.00

Sampler Type: SS
Sampler O.D. (in.): 2
Sampler Length (in.): 24
Rock Core Size: N/A

Groundwater Depth (ft.)

Date	Time	Stab. Time	Water	Casing
11/16/2017	07:15 AM	-1051 min	17.30	35.00

Depth (ft)	Casing Blows/ Core Rate	Sample						Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Depth (ft.)	Stratum Description	Elev. (ft.)
		No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)							
125		S-28	120.0- 122.0	24	15	30 35 52 49	87	S-28: Very dense, tan to white, fine to coarse SAND, little Gravel, trace Silt.				SAND	
								End of exploration at 122 feet.	5		122	-103.3	
130													
135													
140													
145													
150													

5 - Borehole backfilled with grout

REMARKS

See Log Key for exploration of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Exploration No.:
TB-4

GZA TEMPLATE TEST BORING - GZA 2016_09_22.GDT - 1/5/18 16:02 - \\GZAFAR\FIELD\JOBS\GINT PROJECT DATABASES\12.0076146.20.GPJ



ATTACHMENT C

LABORATORY TEST RESULTS

LABORATORY TESTING DATA SHEET



Project Name Trenton BioGas
 Project No. 12.0076146.00
 Project Manager Marc Huddock

Location Trenton, NJ
 Assigned By Victoria Brumbaugh
 Report Date 5/29/2013

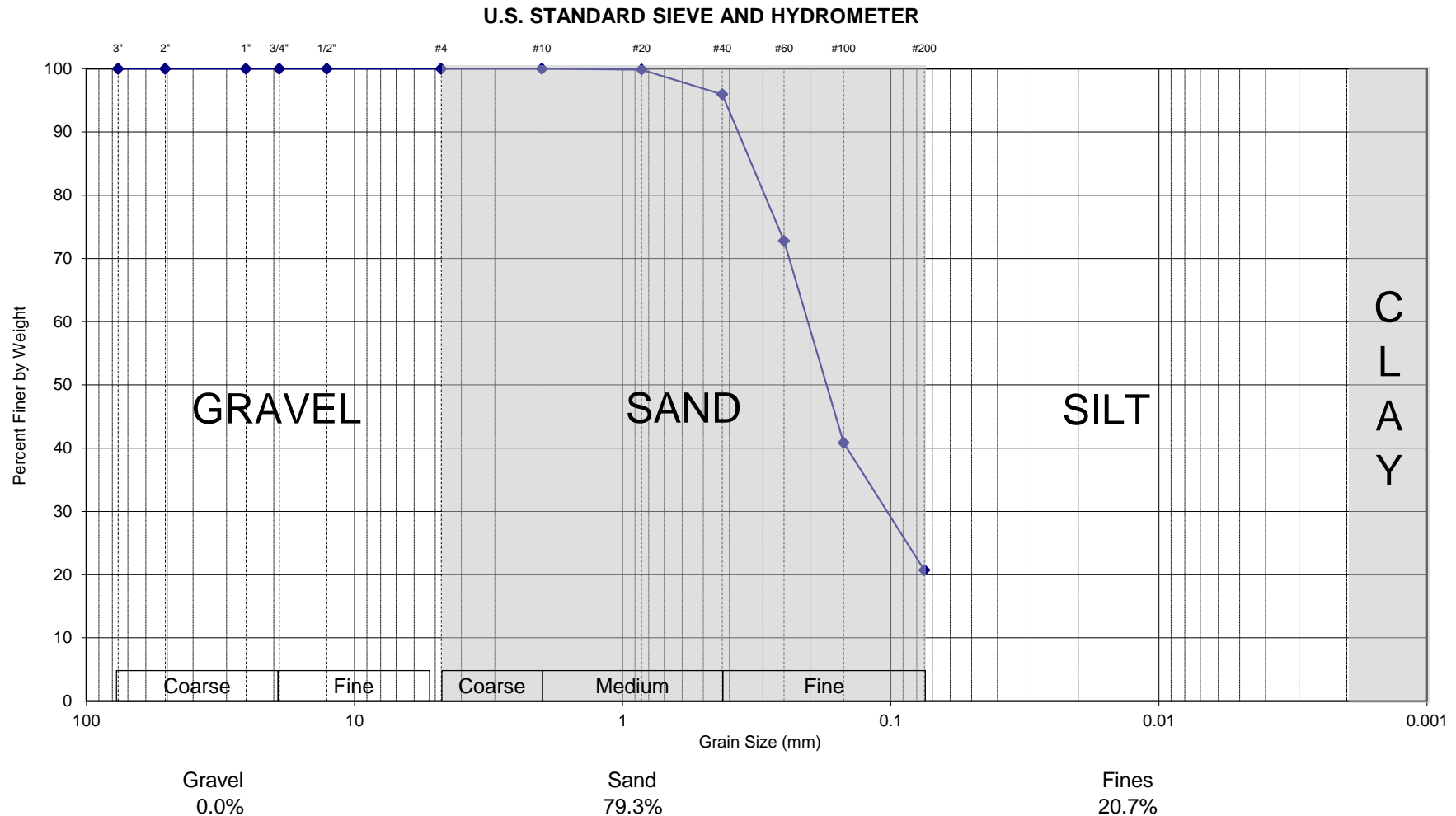
Reviewed By _____
 Date Reviewed 5/29/2013

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					Consol.	Laboratory Log and Soil Description
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2 μ %	ORG %	G _s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	$\frac{C_c}{1 + e_0}$	
SB-2	S-8	20-22	1				20.7											Dark brown fine SAND, some Silt
SB-3	S-6	10-12	2	97.6	98	53												
SB-3	S-8	20-22	3				33.8											Dark brown fine SAND, some Silt
SB-4	S-8	20-22	4	34.9	28	21												
SB-4	S-10	30-32	5	24.0	31	19												
SB-6	S-3	4-6	6	111.3	98	54	86.2											Brown Organic SILT, little fine Sand
SB-6	S-7	20-22	7				4.8											Brown f-c GRAVEL, some f-c Sand, trace Silt
SB-7	S-7	20-22	8				17.1											Brown f-m SAND, little Silt
SB-1	S-6	10-12	9				9.2											Light brown fine SAND, trace Silt



195 Frances Avenue
 Cranston, RI 02910

401-467-6454

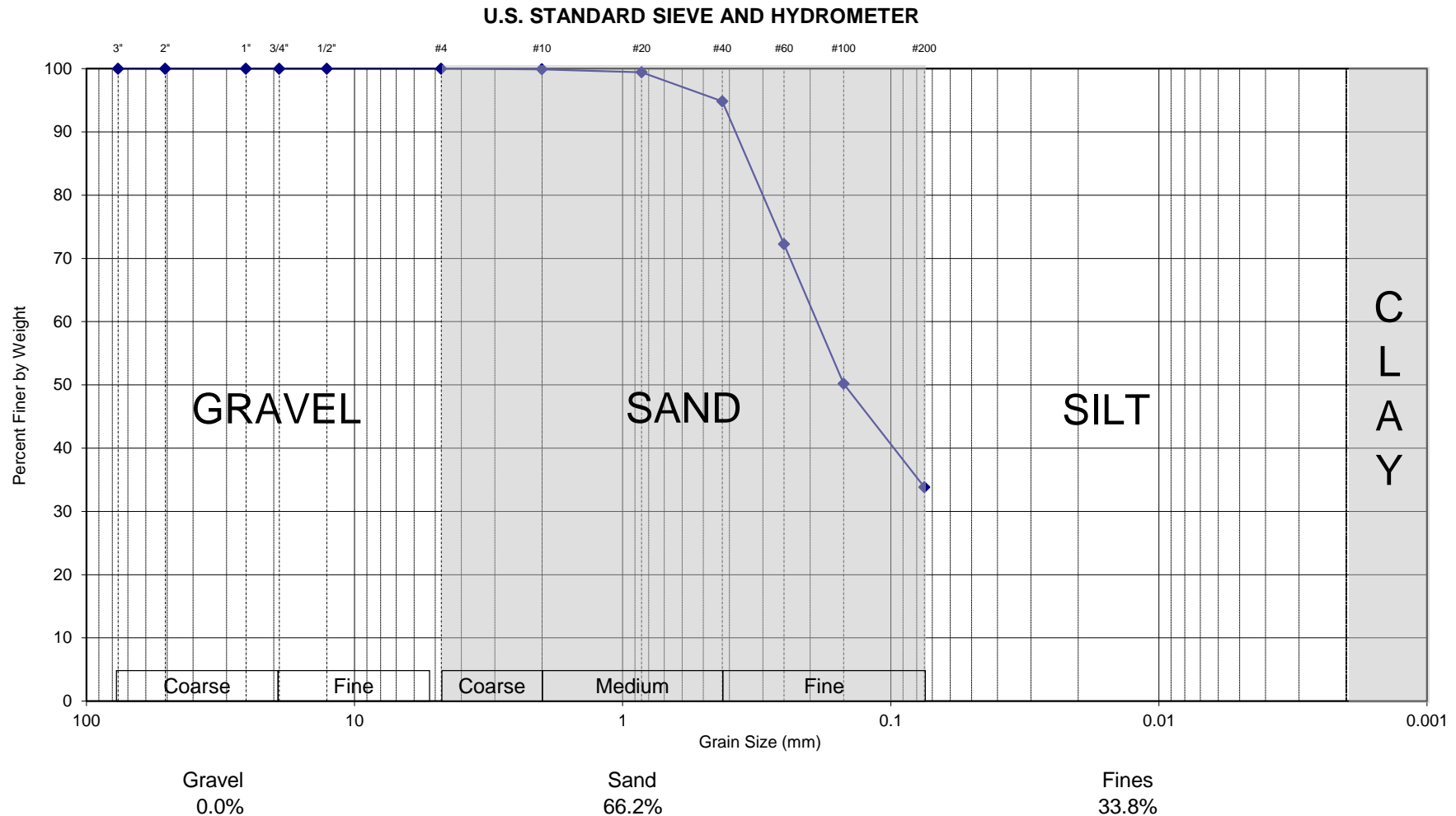


Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
1	SB-2	S-8	20-22'	Dark brown fine SAND, some Silt				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	95.9
#60	72.8
#100	40.8
#200	20.7

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00
Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



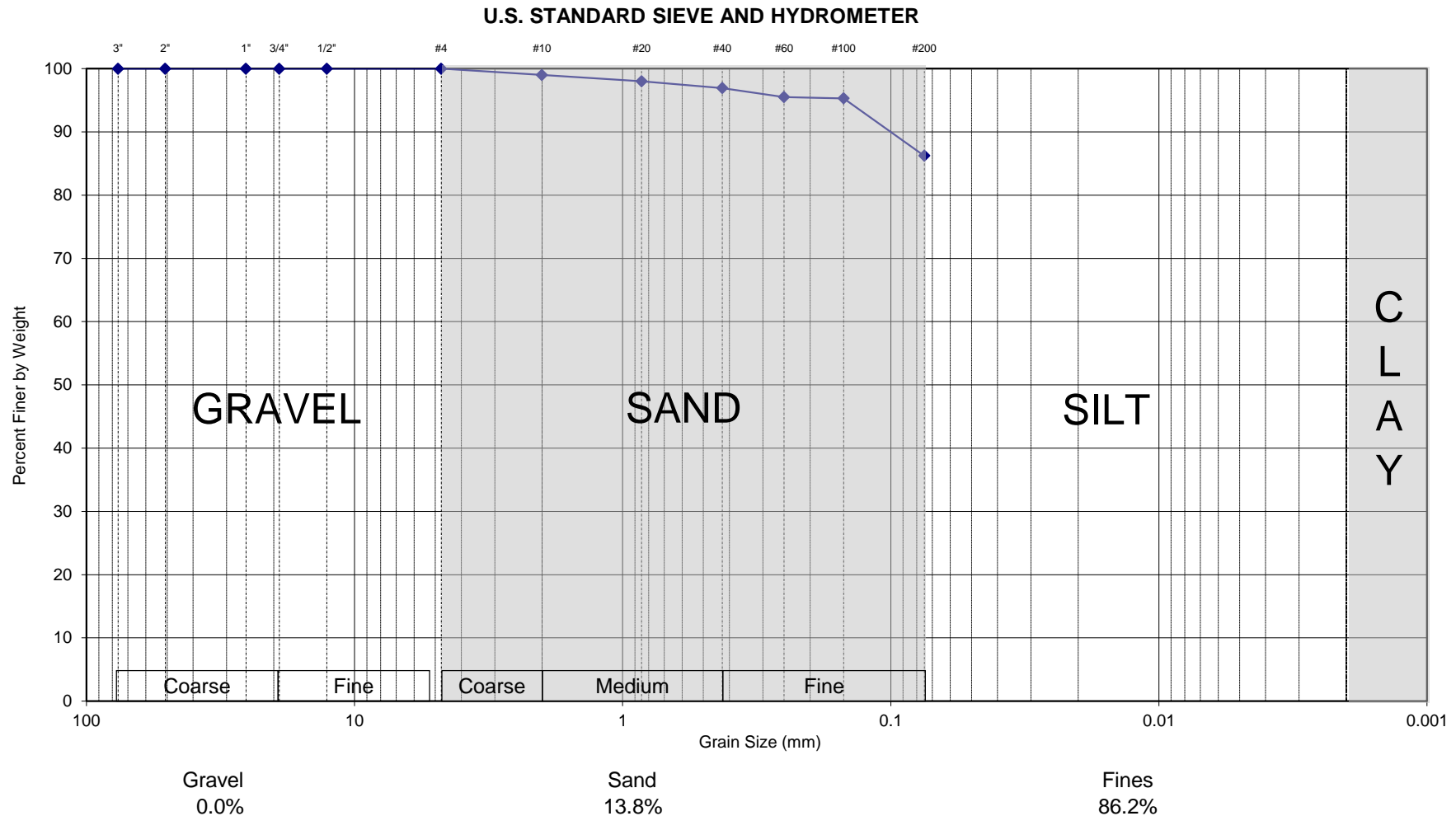
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
3	SB-3	S-8	20-22'	Dark brown fine SAND, some Silt				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.9
#20	99.4
#40	94.8
#60	72.2
#100	50.2
#200	33.8

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



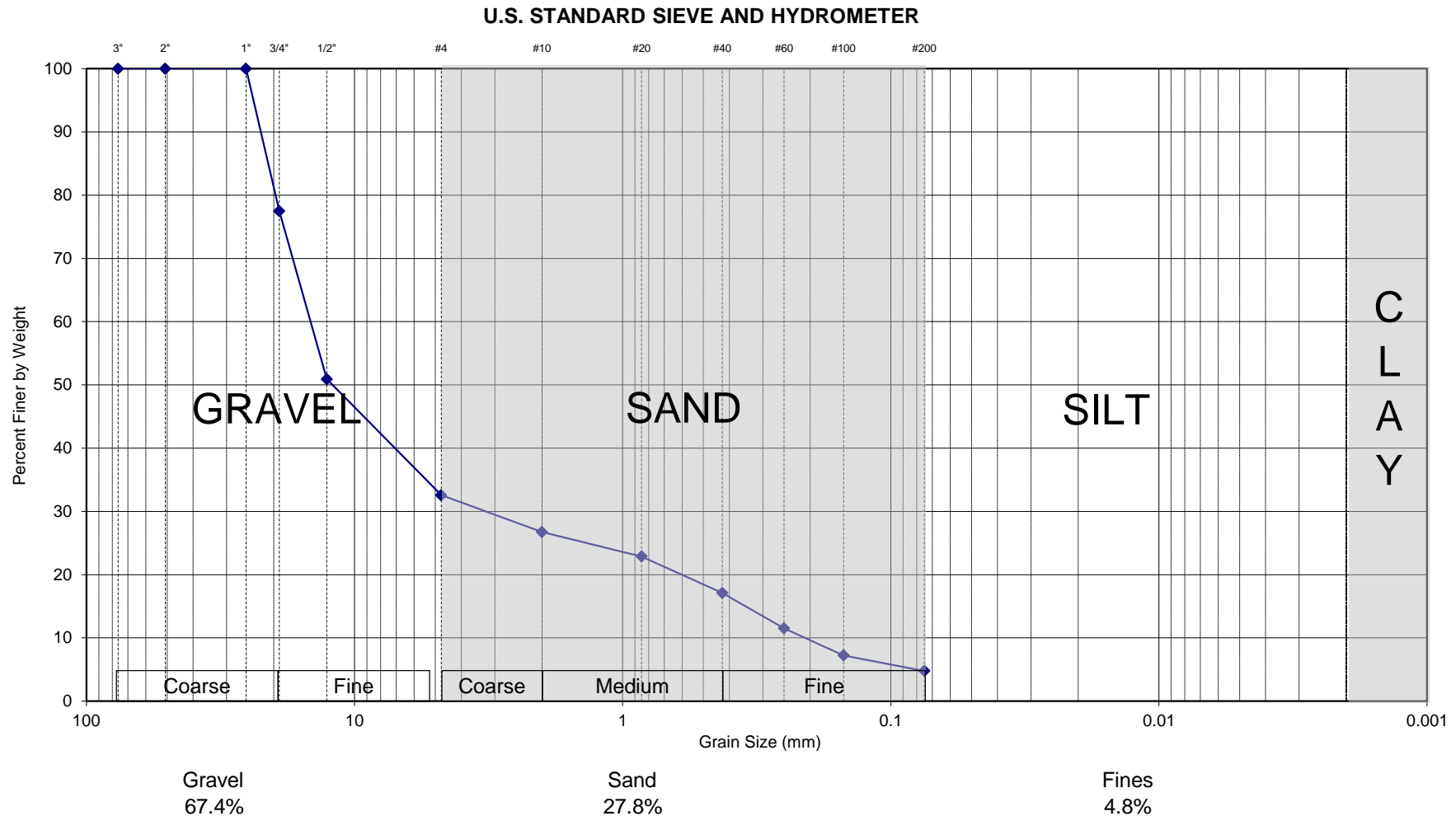
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
6	SB-6	S-3	4-6'	Brown Organic SILT, little fine Sand	111.3	98	54	44

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.0
#20	98.0
#40	96.9
#60	95.5
#100	95.3
#200	86.2

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13

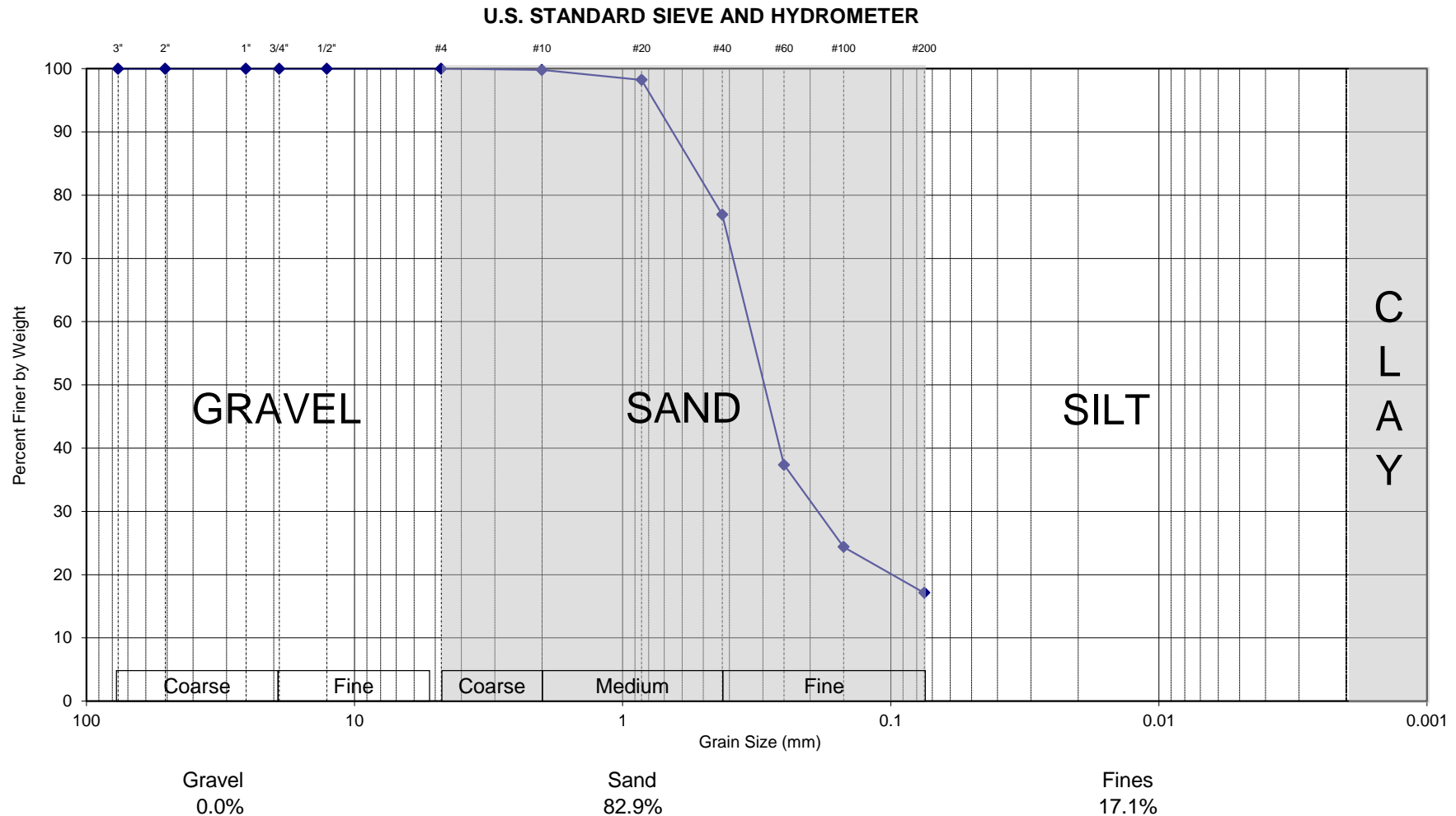


Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
7	SB-6	S-7	20-22'	Brown f-c GRAVEL, some f-c Sand, trace Silt				

Sieve Size	% Passing
3/4"	77.5
1/2"	50.9
#4	32.6
#10	26.7
#20	22.9
#40	17.1
#60	11.5
#100	7.2
#200	4.8

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00
Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



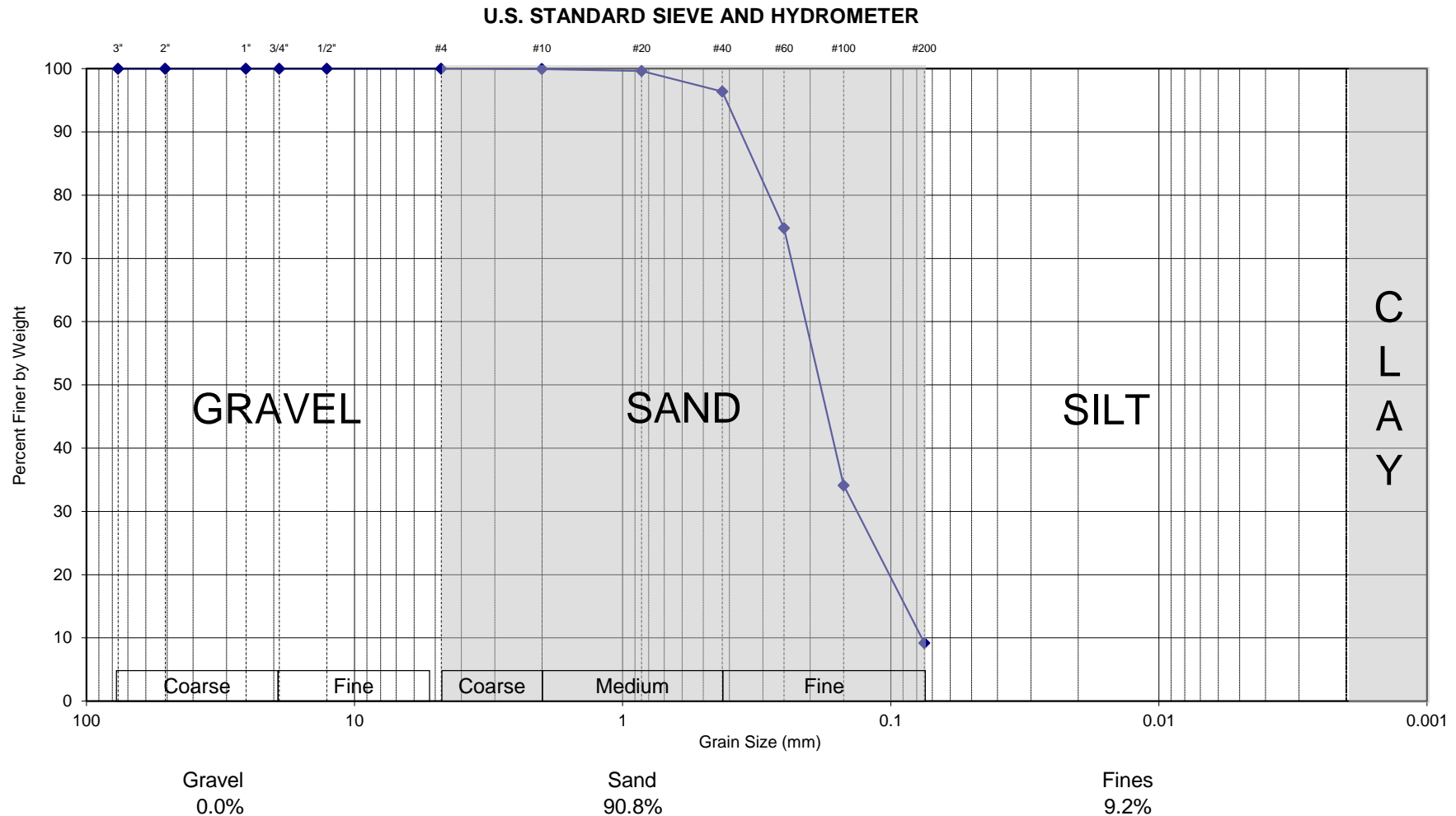
Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
8	SB-7	S-7	20-22'	Brown f-m SAND, little Silt				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	99.8
#20	98.2
#40	76.9
#60	37.4
#100	24.4
#200	17.1

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00

Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13



Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
9	SB-1	S-6	10-12'	Light brown fine SAND, trace Silt				

Sieve Size	% Passing
3/4"	100.0
1/2"	100.0
#4	100.0
#10	99.9
#20	99.6
#40	96.4
#60	74.8
#100	34.1
#200	9.2

THIELSCH
ENGINEERING

CTS-74-13-0003
Trenton BioGas
Trenton, NJ
GZA File # 12.0076146.00
Tested by: GG/PC Date: 5/24/13
Reviewed by: MBP Date: 5/29/13

CERTIFICATE OF ANALYSIS

Victoria Brumbaugh
GZA GeoEnvironmental, Inc.
501 Office Center Drive, Suite 220
Ft. Washington, PA 19034

RE: Trenton BioGas (12.0076146.00)
ESS Laboratory Work Order Number: 1305599

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.



Laurel Stoddard
Laboratory Director

REVIEWED*By ESS Laboratory at 11:49 am, Jun 07, 2013***Analytical Summary**

The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with NELAC Standards, A2LA and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

SAMPLE RECEIPT

The following samples were received on May 31, 2013 for the analyses specified on the enclosed Chain of Custody Record.

Client did not deliver samples in a cooler.

Lab Number	SampleName	Matrix	Analysis
1305599-01	SB-1 S-1 0-2ft	Soil	9038, 9045, 9250
1305599-02	SB-2 S-1 0-2ft	Soil	9038, 9045, 9250
1305599-03	SB-3 S-2 2-4ft	Soil	9038, 9045, 9250
1305599-04	SB-4 S-2a 2-4ft	Soil	9038, 9045, 9250
1305599-05	SB-6 S-2 2-4ft	Soil	9038, 9045, 9250



ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory

*The Microbiology Division
of Thielsch Engineering, Inc.*



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

PROJECT NARRATIVE

No unusual observations noted.

End of Project Narrative.

DATA USABILITY LINKS

[Definitions of Quality Control Parameters](#)
[Semivolatile Organics Internal Standard Information](#)
[Semivolatile Organics Surrogate Information](#)
[Volatile Organics Internal Standard Information](#)
[Volatile Organics Surrogate Information](#)
[EPH and VPH Alkane Lists](#)



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5035 - Solid Purge and Trap



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-1 S-1 0-2ft
Date Sampled: 05/16/13 00:00
Percent Solids: 86

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-01
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (35)		9250		1	EEM	06/04/13 12:52	mg/kg dry	CF30426
Corrosivity (pH)	6.41 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.1 °C.								
Sulfate	WL 313 (58)		9038		1	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-2 S-1 0-2ft
Date Sampled: 05/15/13 00:00
Percent Solids: 88

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-02
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (34)		9250		1	EEM	06/04/13 12:54	mg/kg dry	CF30426
Corrosivity (pH)	7.04 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.0 °C.								
Sulfate	WL 66 (56)		9038		1	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-3 S-2 2-4ft
Date Sampled: 05/16/13 00:00
Percent Solids: 86

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-03
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (35)		9250		1	EEM	06/04/13 12:54	mg/kg dry	CF30426
Corrosivity (pH)	6.93 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.1 °C.								
Sulfate	WL 598 (116)		9038		2	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-4 S-2a 2-4ft
Date Sampled: 05/15/13 00:00
Percent Solids: 81

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-04
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL 101 (37)		9250		1	EEM	06/04/13 12:55	mg/kg dry	CF30426
Corrosivity (pH)	10.4 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 21.9 °C.								
Sulfate	WL 713 (122)		9038		2	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas
Client Sample ID: SB-6 S-2 2-4ft
Date Sampled: 05/17/13 00:00
Percent Solids: 75

ESS Laboratory Work Order: 1305599
ESS Laboratory Sample ID: 1305599-05
Sample Matrix: Soil

Classical Chemistry

<u>Analyte</u>	<u>Results (MRL)</u>	<u>MDL</u>	<u>Method</u>	<u>Limit</u>	<u>DF</u>	<u>Analyst</u>	<u>Analyzed</u>	<u>Units</u>	<u>Batch</u>
Chloride	WL ND (40)		9250		1	EEM	06/04/13 12:56	mg/kg dry	CF30426
Corrosivity (pH)	7.58 (N/A)		9045		1	LLZ	05/31/13 12:57	S.U.	CE33102
Corrosivity (pH) Sample Temp	Soil pH measured in water at 22.2 °C.								
Sulfate	WL 358 (66)		9038		1	DPS	05/31/13 13:30	mg/kg dry	CE33130



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
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Classical Chemistry

Batch CE33130 - General Preparation

Blank

Sulfate	ND	5	mg/kg wet
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LCS

Sulfate	9		mg/L	9.988	95	80-120
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Batch CF30426 - General Preparation

Blank

Chloride	ND	3	mg/kg wet
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LCS

Chloride	32		mg/L	30.00	107	90-110
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CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.

Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

Notes and Definitions

Z-10c	Soil pH measured in water at 22.2 °C.
Z-10b	Soil pH measured in water at 22.1 °C.
Z-10a	Soil pH measured in water at 22.0 °C.
Z-10	Soil pH measured in water at 21.9 °C.
WL	Results obtained from a deionized water leach of the sample.
U	Analyte included in the analysis, but not detected
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report



CERTIFICATE OF ANALYSIS

Client Name: GZA GeoEnvironmental, Inc.
Client Project ID: Trenton BioGas

ESS Laboratory Work Order: 1305599

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Department of Defense (DoD) Environmental Laboratory Accreditation Program (ELAP)

A2LA Accredited: Testing Cert# 2864.01

<http://www.a2la.org/scopepdf/2864-01.pdf>

Rhode Island Potable and Non Potable Water: LAI00179

<http://www.health.ri.gov/labs/waterlabs-instate.php>

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750

http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutOfStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI0002

http://www.maine.gov/dep/blwq/topic/vessel/lab_list.pdf

Massachusetts Potable and Non Potable Water: M-RI002

<http://public.dep.state.ma.us/labcert/labcert.aspx>

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424

<http://www4.egov.nh.gov/des/nhelap/namesearch.asp>

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313

<http://www.wadsworth.org/labcert/elap/comm.html>

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006

http://datamine2.state.nj.us/dep/DEP_OPRA/

United States Department of Agriculture Soil Permit: S-54210

Maryland Potable Water: 301

http://www.mde.state.md.us/assets/document/WSP_labs-2009apr20.pdf

CHEMISTRY

A2LA Accredited: Testing Cert # 2864.01

Lead in Paint, Phthalates, Lead in Children's Metals Products (Including Jewelry)

<http://www.A2LA.org/dirsearchnew/newsearch.cfm>

CPSC ID# 1141

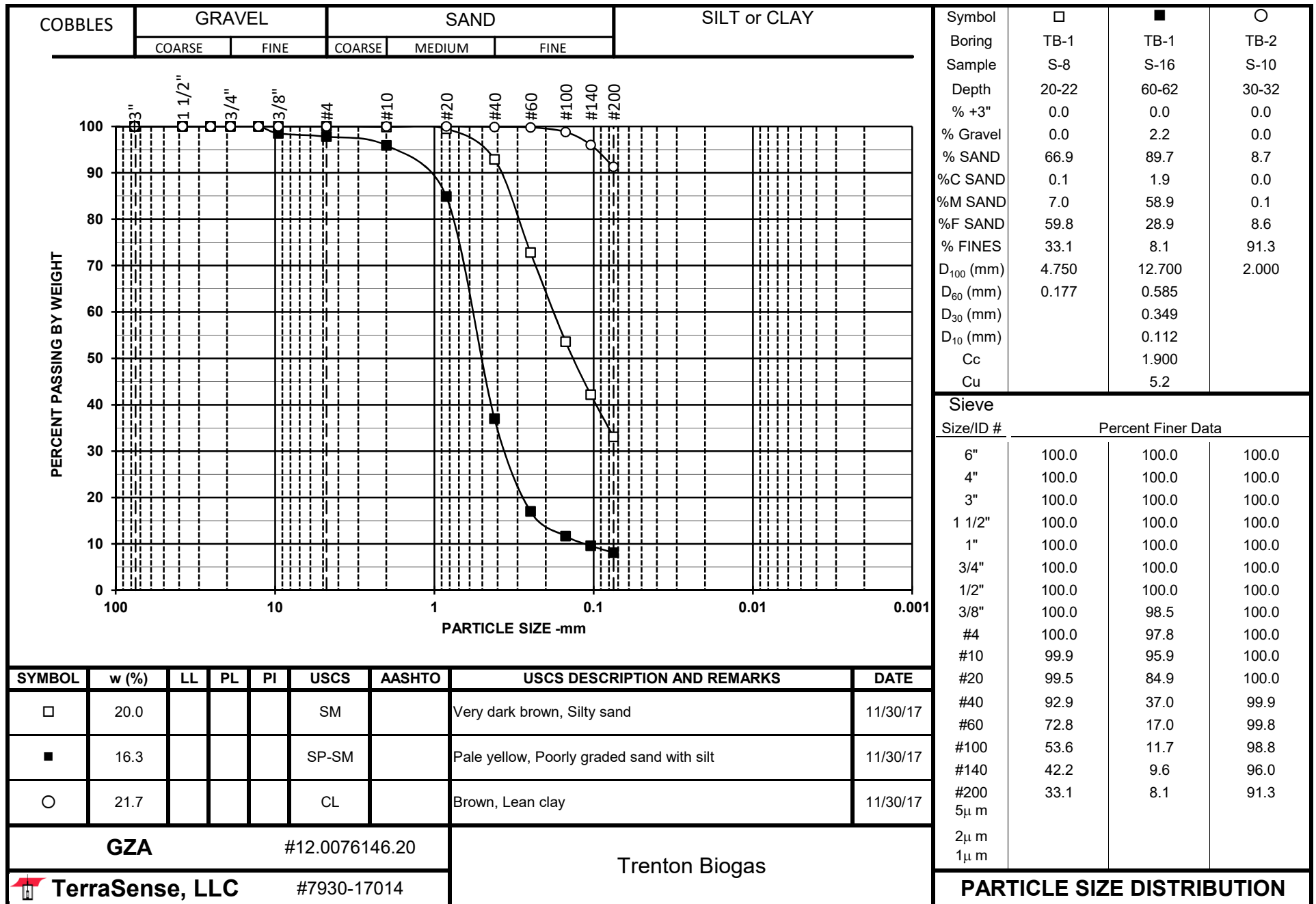
Lead Paint, Lead in Children's Metals Jewelry

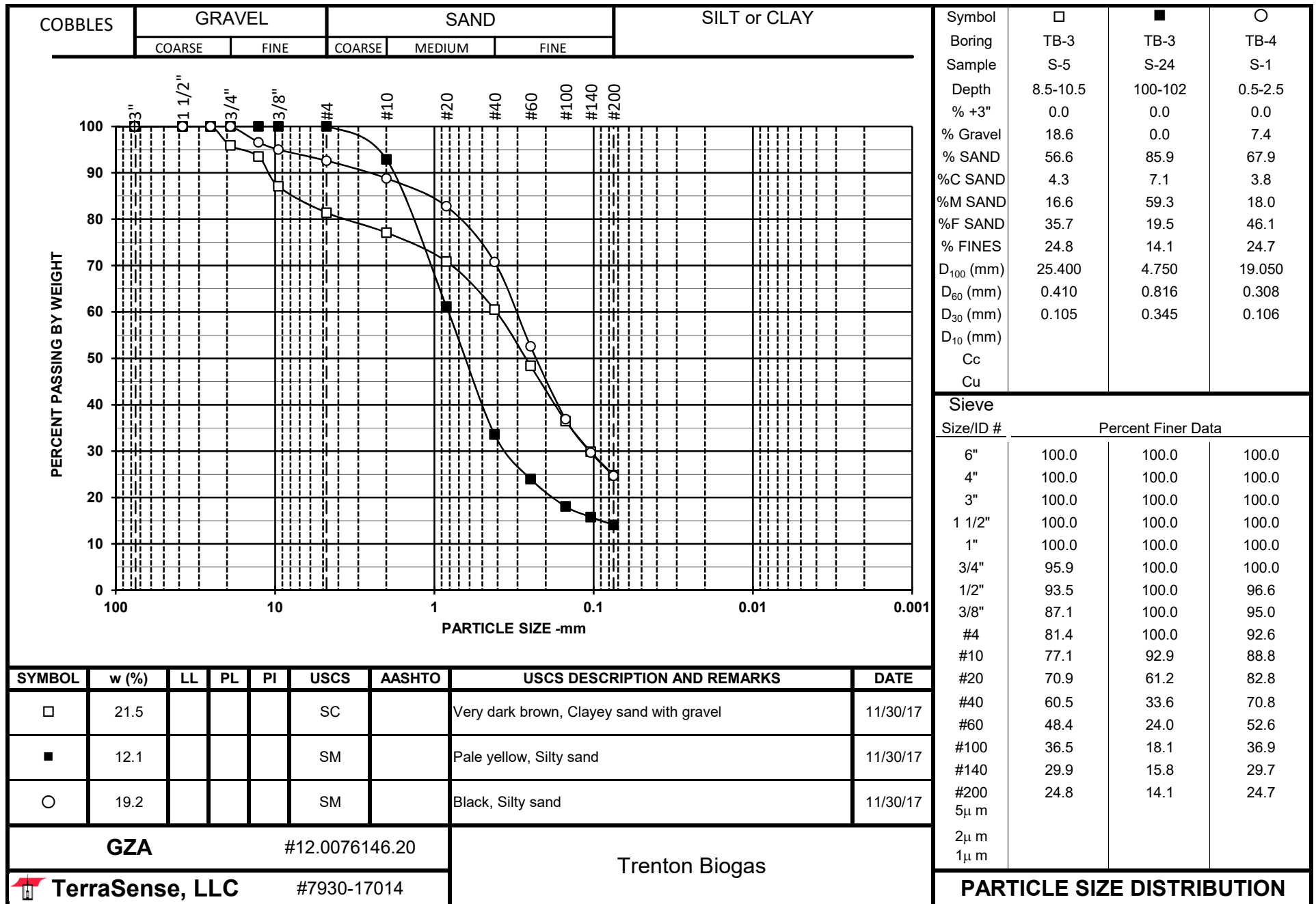
<http://www.cpsc.gov/cgi-bin/labapplist.aspx>

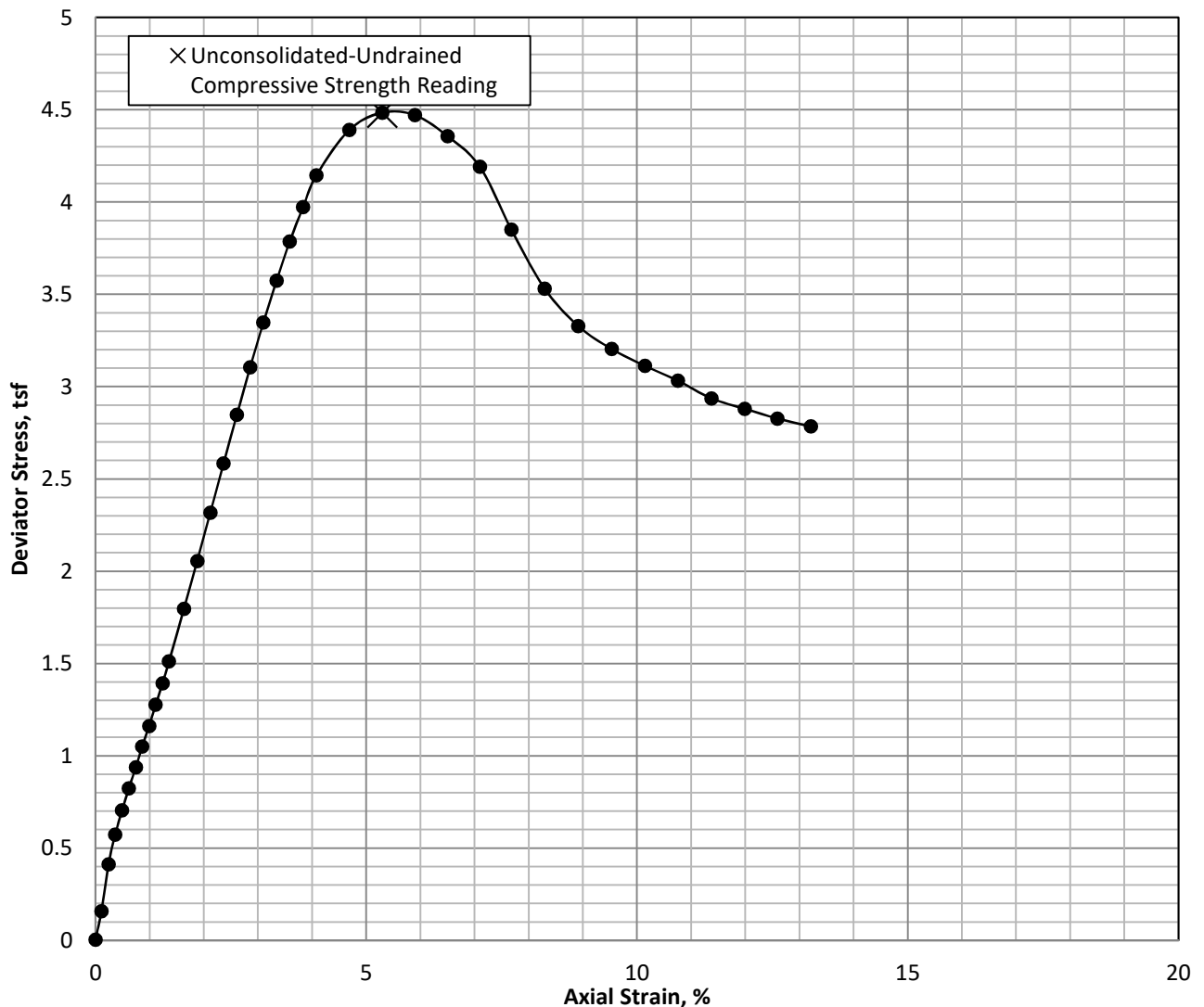
GZA #12.0076146.20
Trenton Biogas
LABORATORY TESTING DATA SUMMARY

BORING NO.	SAMPLE NO.	DEPTH (ft)	IDENTIFICATION TESTS								STRENGTH			REMARKS
			WATER CONTENT (%)	LIQUID LIMIT (-)	PLASTIC LIMIT (-)	PLAS. INDEX (-)	USCS SYMB. (1)	SIEVE MINUS NO. 200 (%)	TOTAL UNIT WEIGHT (pcf)	DRY UNIT WEIGHT (pcf)	Type Test	PEAK DEVIATOR STRESS (tsf)	AXIAL STRAIN @ PEAK STRESS (%)	
TB-1	S-7	15-17	28.2	27	21	6	CL-ML							
TB-1	S-8	20-22	20.0				SM	33.1						
TB-1	U-1	45-47							126.1					
TB-1	U-1	45.2	28.8											
TB-1	U-1	45.75	20.4											
TB-1	U-1	46.3	21.5											
TB-1	U-1	46.55	22.6				CL		126.2	102.9	UU@1.7	4.5	5.3	UU-j334a
TB-1	S-16	60-62	16.3				SP-SM	8.1						
TB-2	U-2	17-19							79.6					Disturbed
TB-2	U-2	17.15	221.3											
TB-2	U-2	17.5	189.5											
TB-2	S-10	30-32	21.7				CL	91.3						
TB-3	S-5	8.5-10.5	21.5				SC	24.8						
TB-3	S-12	40-42	21.9	23	15	8	CL							
TB-3	S-24	100-102	12.1				SM	14.1						
TB-4	S-1	0.5-2.5	19.2				SM	24.7						
TB-4	S-6	10.5-12.5	93.8	78	41	37	OH							
TB-4	S-8	20-22	47.5	40	27	13	ML							

Note: (1) USCS symbol based on visual observation and Sieve and Atterberg limits reported.



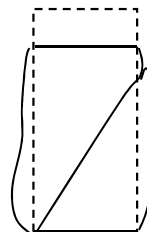


UNCONSOLIDATED-UNDRAINED COMPRESSIVE STRENGTH TEST, ASTM METHOD D2850**Specimen and Material Property Information****Sample Type:** Intact tube sample**Description and/or Classification:** CL, gray clay with silt layers

Cell Pressure (tsf)	Water ⁽¹⁾ Content (%)	Wet Unit Weight (pcf)	Dry Unit ⁽¹⁾ Weight (pcf)	Void Ratio (-)	Saturation ⁽²⁾ (%)	Length (inch)	Diameter (inch)	L/D (-)	LL/PL (-)	PI (-)	Specific ⁽²⁾ Gravity (-)
0 (Initial)	22.6	126.2	102.9	0.64	95.8	6.016	2.875	2.1			2.70
1.7	22.6	126.6	103.3	0.63	96.6	6.009	2.872	2.1			

Failure Summary

U-U Compressive Strength (tsf)	U-U Shear Strength, s_u (tsf)	Strain to Peak (%)	Strain Rate (%/min)
4.48	2.24	5.3	0.73

**FAILURE SKETCH****Remarks and Notes:**

- (1) Water Content determined after shear from partial specimen.
 (2) Assumed specific gravity

Tested by: BB

Reviewed by: GET

Test Date: 11/30/2017

Review Date: 12/11/2017

GZA

Project # 12.0076146.20

TerraSense, LLC

Project # 7930-17014

Trenton Biogas**UNCONSOLIDATED-UNDRAINED COMPRESSION TEST**

Boring: TB-1 Sample: U-1
Section: C Depth: 46.55 ft.

EXHIBIT C

Ground Improvement Services, Inc.

PO Box 918
Purcellville, VA 20134
862-763-0468
klevins@geostructures.com

Quotation/Contract No. 1

To: Brian Till
Symbiont (Herein after referred to as Purchaser)
6737 W Washington St.
Milwaukee, WI 53214

Project Name: Trenton Biogas
Location: Trenton, NJ
GIS Project No.: 7820 RI
Date: January 30, 2018

Bid Documents and Applicable Contract Specifications:

1. Geotechnical Engineering Report, prepared by GZA, dated January 5, 2018.
2. Scope of Work – Soil Improvements, dated July 13, 2016.
3. Foundation Plan Sheet Nos. D-020-S-100, D-020-S-500 prepared by AMEC Foster Wheeler, dated July, 11, 2016.
4. Structural Drawing Nos. D-000-M-100; D-000-S-010; D-000-S-012; D-000-S-100; D-000-S-101; and D-000-S-500, dated July 11, 2016.
5. Trenton Biogas Proposal Refresh – Full Proposal Layout by Disc: 18-April-17 Preliminary

This quotation will expire at midnight on the 20th day after the date of this letter unless signed by the Purchaser and received by Ground Improvement Services, Inc. (herein referred to as Subcontractor) prior to the expiration date. The date of Subcontractor's receipt of the quotation signed by the Purchaser is the "Effective Date" of the Contract. Subcontractor may withdraw, assign or modify this quotation by notifying the Purchaser prior to the Effective Date. The pricing contained herein is based on all work being completed within 30 days after the Effective Date unless otherwise agreed to in writing. The terms and price adjustment needed for work performed more than 30 days after the Effective Date will be reflected in a written change order executed prior to Subcontractor beginning or continuing work. This Quotation is predicated on the terms and conditions contain herein. Once signed by Purchaser, this Quotation and the terms and conditions set forth below will become the final, binding contract between the parties for the work identified in this Quotation. In the event that this Quotation is not agreed to as the final contract between the parties and/or these terms and conditions are not incorporated into the final agreement between the parties, Subcontractor's price as reflected herein shall not be binding and Subcontractor shall be afforded an opportunity to revise its price to reflect the modified terms of the parties' agreement.

1. **SCOPE OF WORK** - This contract is based on the installation of Rigid Inclusion (RI) elements for foundation support for the proposed Digester Tanks T-12100, T-12200, and T-12300 and Digester Buffer Tank T-10400. **RI elements will be installed in such a manner that no pad will need to be placed between the top of element and the bottom of footing. See Figure 1.**

- 1.1 Design services as part of this contract will be provided by a professional engineer (P.E.) licensed in the State of New Jersey.
- 1.2 Mat foundation support for the proposed Digester Tanks and Buffer Tank is included in this pricing. Design loads are based on the Allowable Bearing Pressures given in Section 01 10 29 – Scope of Work – Ground Improvements. Confirmation of actual loads (i.e., kips/sqft for supported mat foundations) shall be provided by others for final RI design.

- 1.3 RI elements shall be designed for settlement control due to compressive vertical loading only. Footing uplift, sliding resistance, and any transient loading should be verified by others.
- 1.4 All RI elements are assumed to fully penetrate the uncontrolled fill as depicted in the Geotechnical Engineering Report/Soil Boring Logs and terminate in natural soil.
- 1.5 Total post construction settlements will be designed in accordance with the contract drawings, specifications, and addendum.
- 1.6 It has been assumed that there are no new or existing utility conflicts. Subcontractor shall be responsible to contact New Jersey 811 prior to RI installation. All other utility location shall be by others. Location and coordination of all proposed underground construction, including but not limited to utilities, shall be by others such that construction activities shall not damage installed RI elements and that RI elements are not in conflict with previous underground construction activities.
- 1.7 Grading coordination will be required so that the site shall be provided to Subcontractor at approximately existing grade, or at an elevation that requires no more than three feet of overburden drilling (as measured from bottom of footing).
- 1.8 Installation will take place for all RI elements during one mobilization and the sequence of operations shall allow for continuous RI installation. Additional mobilizations required by others can be provided at the unit rate below.
- 1.9 Union labor will be utilized for the construction of this project. A master mechanic and/or lead operating engineer is not included and shall be supplied by others if local labor agreements require them.
- 1.10 One (1) modulus test shall be performed to confirm RI design parameters.
- 1.11 Purchaser/Owner shall advise subcontractor of any site environmental hazards (surface or subsurface) which could affect personnel and/or RI installation procedures and shall coordinate with subcontractor to develop an appropriate health and safety plan prior to work start-up if hazards are known to exist.
- 1.12 Adequate horizontal and vertical clearance shall be provided by others for the duration of the work. All demolition, debris removal, removal or mitigation of any interference with Pier installation such as powerlines, building overhangs, signs, above or below ground utilities and structures, underpinning, support of excavation operations existing construction, etc., or interference of, or caused by, existing structures shall be completed by others prior to Subcontractor mobilization. Purchaser is responsible for all additional performance costs and/or additional performance time resulting from site conditions that materially affect Subcontractor's work.
- 1.13 Project site shall be available to subcontractor between 7am and 5pm, Monday through Saturday so that it may optimize manpower and equipment utilization as required for timely completion of work. **It is expected that installation of RI elements for mat foundation support will take approximately 21 working days (after mobilization and installation of modulus test piers).** Schedule durations provided are approximate and do not include any add alternate work provided below. Installation shall commence after completion of modulus test. Production rates provided are in accordance with a standard 5-day, 40-hour week. Additional hours, beyond a 40-hour work week, required due to no fault of this subcontractor may be subject to additional cost.
- 1.14 Subcontractor shall consolidate drill spoils (if pre-drilling or spoil generation is required) at a mutually agreed upon location on site within 100 feet of RI installation location.
- 1.15 No additional insurance or schedule restrictions for railroad proximity are included in this proposal. GIS reserves the right to adjust pricing should any railroad restrictions apply to this work.
- 1.16 Subcontractor shall install RI elements to design depth, or refusal on suitable material.
- 1.17 Elevations were not provided on the Boring Logs, it was assumed that they were all taken from current elevation and that the proposed/existing elevation is the same.

2. CONTRACT AMOUNT – is based on a lump sum as follows:

Engineering	\$ 47,800
Mobilization	\$ 52,000
Modulus Test	\$ 17,000
Installation of Digester Tanks (3) RI elements	\$ 418,360
Installation of Buffer Tank RI elements	\$ 63,750

TOTAL CONTRACT AMOUNT = \$ 598,910

The following alternates are also provided:

Additional Mobilizations:	\$ 52,000 per each
Standby time for delays caused by others:	\$ 1,760 per crew hour
Bond:	1.7% of Total Contract Amount

Engineering Rates (only as authorized by Purchaser):

Principal	\$ 175 per hour
Professional Engineer	\$ 125 per hour
Staff Engineer	\$ 85 per hour
CAD Support	\$ 75 per hour
Administrative Support	\$ 50 per hour

3. PAYMENT TERMS – Purchaser shall pay Subcontractor in full within thirty (30) calendar days of invoice date for all properly completed work for which payment is invoiced. Retention, if any, is due 45 calendar days after Subcontractor has properly completed all contracted work provided that Owner has accepted all Subcontractor's work and all required paperwork and documentation has been submitted prior to the 45th day. Retention will not be withheld on Engineering services, bond fees or materials broken out separately in the Schedule of Values. Such materials must be paid for 30 days after delivery to the project site regardless of the pay application cycle. A service charge of 1-1/2% per month is due on any payments not made within thirty days of the invoice date. On phased projects or Owner/GC-delayed projects, retention shall not be withheld beyond 45 days after Subcontractor has demobilized from the site. The cancellation of Purchaser's contract with Owner will not relieve Purchaser's obligation to pay for completed work.

4. ADDITIONAL WORK – Unit prices where applicable shall apply to all extra work performed beyond the original Contract Amount quantities per Section 2 above, if such work can be performed at the same time Subcontractor is working at the site on the original quantities. Subcontractor reserves the right to renegotiate any unit prices if it must move equipment back to the site to perform any extra or additional work without prior price agreement. Subcontractor is under no obligation to perform any extra or additional work without prior price agreement. Subcontractor is entitled to an equitable adjustment in the contract price and/or the time available to perform the work as a result of site or subsurface conditions, including modulus test values, that differ from those reflected in the soil test borings or the Project Geotechnical Report or from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract. Additional design work will be performed in accordance with the unit rates in paragraph 2 above as directed. Additional engineering expenses will be billed at cost plus 10%. Once the Purchaser supplies Subcontractor with an executed Change Order for additional work, Purchaser is obligated to pay Subcontractor for all properly completed work covered by the executed Change Order per the terms and conditions of Section 3.

5. EXCLUSIONS (to be provided and paid for by others):

5.1 Access to the site for wheeled and tracked equipment, provide a level, stable working platform, safe site and access ramps, if required (into and out of the excavation), trafficable for Subcontractor equipment, and a water source on-site within 100 feet of the work area shall be provided by others for the duration of the work.

5.2 Any existing foundation elements, such as drilled shafts, piles, continuous or spread footings, etc., shall be located and surveyed by others. The locations shall be provided to the RI designer of record for coordination with RI locations where possible. If an existing foundation element is in conflict with a RI

element that is unable to be relocated, the existing foundation element (pile, etc.) shall be removed by others to a depth of 3 feet below bottom of the RI element.

- 5.3** The removal of any underground or above ground obstructions or unsuitable materials, unable to be augured through, that inhibit or prevent RI installation using the usual RI foundation installation equipment shall be performed by others and controlled fill shall be placed in accordance with the project specifications in a timely manner, and the records shall be provided to the RI designer of record. Unsuitable materials include but are not limited to cobbles, muck, buried concrete, pipes, utilities, boulders, debris, stumps, logs, or trash. Should obstructions or other delays to work caused by others prevent RI installation from proceeding in a continuous manner, then Subcontractor shall be reimbursed at the crew rate listed in this Quotation (eight-hour minimum per work day) for delay.
- 5.4** Proper site drainage and dewatering shall be maintained by others, as necessary, for the duration of the work.
- 5.5** The center of all RI elements shall be surveyed and staked by others. This shall include furnishing existing ground surface elevations on one stake for each isolated footing and at 25-foot intervals within continuous footings.
- 5.6** Any new fill (including fill that is placed as part of utility excavation(s)) shall be placed by others and shall be comprised of readily penetrable material, free of obstructions, and capable of staying open during drilling without sidewall collapse, unless otherwise agreed to in writing. All new fill shall be compacted in accordance with the project plans and specifications. Settlement of new fill shall be complete prior to RI installation. Placement of any open-graded fill prior to RI element installation, including but not limited to utility backfill, shall be coordinated by the Purchaser with subcontractor prior to placement. All fill placement and compaction records and any settlement monitoring data shall be provided to the RI subcontractor under a sealed, signed earthwork completion letter from the Geotechnical Engineer of Record prior to mobilization by the RI subcontractor. The completion letter shall state that: all earthwork has been performed in accordance with the project plans and specifications, any settlement as a result of fill placement is complete, and RI construction can proceed.
- 5.7** Any required environmental remediation, handling, or disposal of contaminated spoils shall be by others.
- 5.8** Excavation for footings, exposing RI tops, and properly compacting excavation subgrades and RI top surfaces in accordance with the RI designer of record's requirements.
- 5.9** Adequate staging areas for equipment setup, maintenance, and breakdown, project administration, and portable toilet facilities on site shall be provided by others.
- 5.10** Purchaser recognizes that RI elements are part of a patented system protected under U.S. Patents and other patents pending. All information furnished regarding RI and RI technology is specifically provided to the Purchaser for the purpose of using on this project only and shall not be transmitted to any other organization. No license is being granted to Purchaser by this agreement.
- 5.11** All drawings of the project foundation plan(s) and any other related drawings necessary to complete the design contracted for in this agreement shall be provided in electronic AutoCAD .dwg format by others, and at no charge to Subcontractor. If required drawings are not supplied in a timely manner by the Purchaser, Subcontractor shall draft the necessary plans from available information and charge Purchaser the cost of such work.
- 5.12** Maintenance of traffic and/or dust mitigation measures and/or street cleaning of any kind shall be provided by others for the duration of the work.
- 5.13** Reuse, loading, and/or removal of drill spoils from the site shall be by others. Approximately 200-400 cubic yards of spoils is expected to be generated by this work which Subcontractor will stockpile onsite within 100 feet of the RI work area for use or disposal by others.
- 5.14** An area to stockpile aggregate large enough to store a minimum of 120 tons shall be provided by others within 100 feet of RI installation areas.

5.15 Any 3rd party QA/QC testing or inspection fees, permits, preconstruction surveys, and/or related noise and/or vibration monitoring, shall be by others if required.

5.16 Any project related Liquidated Damages are excluded.

- 6. LIMIT OF LIABILITY** - Subcontractor's liability for any claims of any nature whatsoever, whether based upon contract, tort, or any other theory of recovery, arising out of or relating to this Agreement shall be limited to no more than the amount of this Quotation. Subcontractor shall have no liability for any amounts in excess of the price of its Quotation, irrespective of the basis for any such claim.

It should be understood that while RI elements will act to improve footing bearing soils, RI elements will not prevent or limit sinkhole formation if conditions for sinkhole activity currently exist or are created in the future. Thus, Subcontractor expressly rejects any and all liability for any and all damages incurred as a result of sinkhole activity associated with this project.

- 7. INDEMNIFICATION** - Subcontractor agrees to indemnify and save Purchaser harmless from any loss, cost or expense claimed by third parties for property damage and bodily injury, including death, caused solely by the negligence or willful misconduct of Subcontractor, its agents, employees or affiliates in connection with the Work.

Purchaser agrees to indemnify and save Subcontractor harmless from any loss, cost or expense claimed by third parties for property damage and bodily injury, including death, caused solely by the negligence or willful misconduct of Purchaser, its agents, employees or affiliates in connection with the Work.

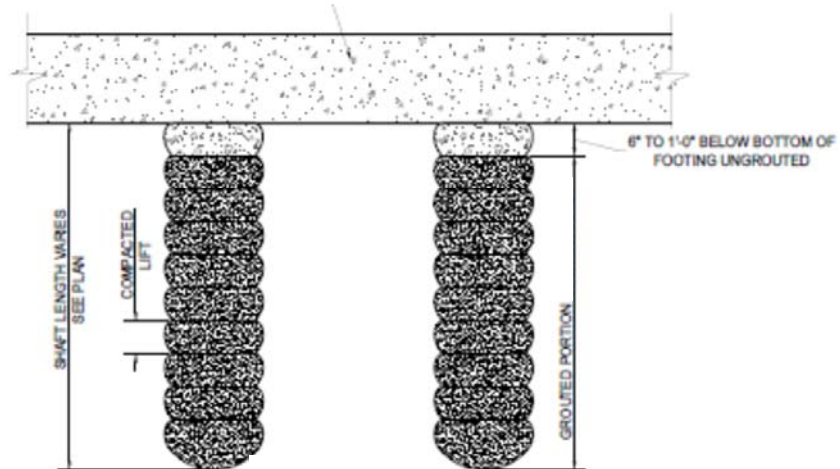
If the negligence or willful misconduct of both Subcontractor and Purchaser (or a person identified above for whom each is liable) is the sole cause of such damage or injury, the loss, cost and expense shall be shared between Subcontractor and Purchaser in proportion to their relative degrees of negligence or willful misconduct and the right of indemnity shall apply for such proportion.

- 8. DISPUTES** – Any and all claims, disputes, issues, and matters in question arising out of or relating to this Agreement, including arbitrability, shall be resolved exclusively and finally by binding arbitration conducted in accordance with the Construction Industry Rules of the American Arbitration Association (“AAA”). The Parties intend this to be a broad arbitration clause and to invoke the presumption in favor of arbitrability as to any ambiguities that may appear in this clause. Issues subject to arbitration include, but are not limited to, the following: (a) disputes relating to the existence, validity, interpretation, scope, performance, or enforceability of the Agreement; (b) any statutory, tort, or common law claims that may be asserted concurrently or independently of the Agreement; and (c) any dispute as to arbitrability. Any arbitration conducted in accordance with this clause shall be conducted in Fairfax or Loudoun County, Commonwealth of Virginia. The award of the arbitrators shall be final, and judgment on the award may be entered by any court having jurisdiction to do so. Costs incurred in the arbitration proceeding, including attorneys’ fees and expenses, shall be borne by the prevailing party as determined by the arbitration panel.

As evidenced by the signatures affixed hereto, this Quotation/Contract is accepted according to the terms and conditions stated herein:

Ground Improvement Services, Inc.	Symbiont
By:	By:
(Signature)	(Signature)
Name:	Name:
(Print or Type)	(Print or Type)
Title:	Title:
Date:	Date:

FIGURE 1 – RIGID INCLUSION SUPPORT DETAIL



GeoStructures

PROJECT No.:	7820GIP
DRAWN BY:	JPT
CHECKED BY:	SMC
DATE:	05/17/2018
SCALE:	AS SHOWN
NOTED:	TRDGRP DETAILS

PROJECT:	TRENTON BIOGAS
LOCATION:	TRENTON, NEW JERSEY

SHEET No.:	SUPPORT DETAIL
SHEET NAME:	RI-1

EXHIBIT D



FORM SDB-3 02-2016

**SYMBIONT® DESIGN-BUILD, LLC
SUBCONSULTANT
PROFESSIONAL SERVICES AGREEMENT**

THIS AGREEMENT is entered into this 8th day of February, 2018, by and between Symbiont Design-Build, LLC (Symbiont) and Ground Improvement Services, Inc. (Subconsultant).

WHEREAS, Symbiont has entered into a written agreement, (the Contract) with Trenton Biogas, LLC (the Owner) for Digester Foundation Design and Permitting Services (the Project).

WHEREAS, Subconsultant represents that it can provide soil improvement design services, described in the Scope of Work of Attachment 1.

Symbiont and the Subconsultant have agreed that the Subconsultant will perform the following services, which are part of the Contract identified above. The services covered by this Agreement will be performed in accordance with the provisions included within this form and any attachments or schedules.

Article 1. Scope of Work

Subconsultant shall perform the services, specified in the Scope of Work section of Attachment 1, which are reasonably necessary and appropriate for the effective and prompt fulfillment of the Subconsultant's obligations under this Agreement. The relationship between the Subconsultant and Symbiont created under this Agreement is that of principal and independent contractor. Services provided by the Subconsultant shall be subject to the provisions of this Agreement including these general conditions, and supplemental conditions incorporated herein, and any written amendments agreed to by both parties.

Symbiont may adjust the Scope of Work by either adding to or deleting from the services to be performed. If such adjustment increases or decreases the cost or time required for the Subconsultant's Scope of Work, adjusted compensation and/or time will be mutually agreed upon in writing. Additional services provided by the Subconsultant will be entitled to additional compensation or extension of time only as authorized in writing by Symbiont. (See Article 24. Change Orders.)

Article 2. Compensation

Symbiont shall pay the Subconsultant for work performed under this Agreement in accordance with the provisions described herein and in the Compensation section of Attachment 1.

Subconsultant shall submit invoices to Symbiont in accordance with the Compensation section of Attachment 1 and no more frequently than monthly unless called for in Attachment 1. Invoices shall be submitted to the attention of Symbiont's project manager indicating the project number noted on Attachment 1 at the following address:

Symbiont
6737 West Washington Street, Suite 3440
Milwaukee, Wisconsin 53214

Following Owner's payment to Symbiont, payment will be made by Symbiont to Subconsultant within 15 days for the approved invoice amount. Subconsultant invoices received after the 5th of the month will not be invoiced to Owner until the middle of the following month, which may result in delay in payment. If Symbiont objects to all or any portion of an invoice, Symbiont shall so notify the Subcontractor within fourteen (14) calendar days of the invoice date, identify the cause of disagreement, and pay when due that portion of the invoice, if any, not in dispute. In the event that Symbiont and the Subconsultant cannot resolve the dispute regarding invoiced amounts within thirty (30) days (or in a time frame mutually agreed to by both parties) after receipt by the Subconsultant of the aforementioned notice, the dispute shall be submitted to dispute resolution pursuant to Article 11, below.

Symbiont may, at its sole discretion, withhold payment to Subconsultant for failure of Subconsultant to provide a Certificate of Insurance pursuant to Article 13 below. Symbiont may withhold or offset payment to Subconsultant for failure to provide all lien waivers and other documents pursuant to Article 16 below.



Article 3. Confidentiality

Symbiont and Subconsultant shall hold confidential all business or technical information obtained from the other or its affiliates or Client/Owner under this Agreement for a period of five (5) years after obtaining such information, and during that period shall not disclose such information without the disclosing party's consent except to the extent required for (1) performance of services under this Agreement; (2) compliance with professional standards of conduct for preservation of the public safety, health and welfare; (3) compliance with any law, regulation, ordinance, subpoena, court order or governmental request; or (4) protection of the disclosing party against claims or liabilities arising from performance of services under this Agreement. In the event disclosure may be required for any of the foregoing reasons, the disclosing party will, except where immediate

notification is required by law or regulation or is, in the judgment of Symbiont's counsel required to limit Symbiont's liability, notify the other party in advance of disclosure. The parties' obligations hereunder shall not apply to information in the public domain or information lawfully acquired on a non-confidential basis from others.

Article 4. Independent Contractor Relationship

The Subconsultant shall serve as an independent consultant to Symbiont and shall have control over and be responsible for the means and methods for providing services under this Agreement. Nothing contained in this Agreement will create any contractual relationship between the Owner and Subconsultant.

The Subconsultant acknowledges and agrees that it will not be an agent of Symbiont and will not have nor represent or hold itself, or allow any of its employees, agents, or Subconsultants to represent or hold itself or himself, out as having authority to bind Symbiont or to incur any obligation whatsoever on behalf of Symbiont. Symbiont shall not be liable to any party in any way for any engagement, obligation, commitment, contract, representation or transaction or any act or omission to act of the Subconsultant as provided in this Agreement.

Article 5. Representation and Warranty

The Subconsultant represents and warrants to Symbiont that the Subconsultant is experienced in the provision of the services to be performed under this Agreement and that such services shall be of a quality and a type usually and customarily provided by Subconsultants performing similar services in and around the locale of the project site.

If under this Agreement the Subconsultant performs any design services, Subconsultant represents and warrants to Symbiont that such design services shall be performed by and/or under the direction of an appropriately registered professional engineer or architect licensed to practice in the state of the subject project. The registered professional shall, upon completion of the design, stamp and certify all plans, specifications, calculations, etc. to certify his or her professional role in the project.

Article 6. Timeliness of Performance

The Subconsultant acknowledges that time is of the essence in completing its services under this Agreement.

Article 7. Force Majeure

Neither party to this Agreement will be liable to the other party for delays in performing the Scope of Work, or for the direct or indirect cost resulting from such delays, that may result from labor strikes, riots, war, acts of governmental authorities, extraordinary weather conditions or other natural catastrophe, or any other cause beyond the reasonable control or contemplation of either party.

In the event either party to the Agreement has knowledge of any actual or potential delay, that party shall notify the other party in writing of such cases in delay and its probable extent.

Article 8. Suspension

The Subconsultant will, upon ten (10) days written notice from Symbiont suspend, delay or interrupt all or a part of the Scope of Work. In such event, the Subconsultant will resume the Scope of Work upon written notice from Symbiont and an appropriate extension of time shall be mutually agreed upon and added to the Subconsultant's time of performance.



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Article 9. Termination

Symbiont will have the right to immediately terminate this Subconsultant Agreement at its discretion upon written notice.

This Agreement may be immediately terminated by either party upon written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof. After termination, Subconsultant will be ~~paid~~reimbursed for services rendered and reimbursed for all necessary expenses incurred to the termination date upon submission to Symbiont of detailed supporting invoices. Subconsultant will not be entitled to profit or other compensation on services not performed.

Either party may terminate this Agreement immediately upon written notice to the other party in the event that the other party becomes insolvent, files a petition in bankruptcy, is adjudicated bankrupt, has an assignee, referee, receiver or trustee appointed in any creditor action, has a petition in bankruptcy filed against it which is not vacated within thirty (30) days or suffers any analogous action.

Article 10. Notice to Parties

All notices required or permitted under this Agreement shall be in writing and shall be made to the parties' usual place of business.

Article 11. Dispute Resolution

Symbiont and Subconsultant shall provide written notice of a dispute within a reasonable time after the event giving rise to the dispute. Symbiont and Subconsultant agree to negotiate any dispute between them in good faith for a period of 30 days following such notice. Symbiont and Subconsultant may agree to submit any dispute to mediation, but such mediation shall not be required as a prerequisite to initiating a lawsuit to enforce this Agreement. Either party shall have the right to litigate the claim, dispute or other matter in question in any state or federal court located in New Jersey~~Milwaukee County, Wisconsin~~. In connection therewith, each party agrees to submit to the jurisdiction of such court.

In the event that legal action is brought by either party against the other in the Courts (including action to enforce or interpret any aspect of this agreement), the prevailing party shall be reimbursed by the other for the prevailing party's legal costs, in addition to whatever other judgments or settlement sums, if any, may be due. Such legal costs shall include, but not be limited to, reasonable attorney's fees, court costs, expert witness fees, and other documents expenses, in addition to any other relief to which it may be entitled.

Neither party will be responsible to the other for special or consequential damages including but not limited to, loss of profits, loss of investment or business interruption. The Subconsultant also agrees to seek recourse only against Symbiont and not its officers, employees, directors, or shareholders.

Article 12. Choice of Law

This Agreement shall be governed and construed in accordance with the laws of the State of New Jersey~~Wisconsin~~, without reference to conflicts of law principles. ~~Each party hereto consents to the exclusive jurisdiction of the state and federal courts located in Milwaukee County, Wisconsin for any actions, suits or proceedings arising out of or relating to this Agreement.~~

Article 13. Insurance

The Subconsultant declares and shall submit an insurance certificate that it maintains the following insurance coverage:

- A. Workers' Compensation:
of a form and in an amount as required by state law
- B. Employer's Liability:
\$1,000,000 per accident
\$1,000,000 disease, policy limit
\$1,000,000 disease, each employee



SYMBIONT
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- C. Commercial General Liability (bodily injury and property damage – combined single limit):
\$1,000,000 per occurrence
\$2,000,000 aggregate
- D. Contractor's Pollution Liability:
\$1,000,000 per occurrence
- E. Automobile Liability (owned, non-owned and hired vehicles):
\$1,000,000 combined single limit
- F. Professional Liability:
\$1,000,000 per occurrence
- G. Excess/Umbrella Liability:
\$2,000,000 per occurrence
\$2,000,000 aggregate

Symbiont and Owner shall be named as an additional insured with respect to Subconsultant's insurance policies described in lines C, D, E, and G above and Subconsultant waives subrogation against Owner and Symbiont as to all policies above and the Subconsultant shall furnish Symbiont with a Certificate evidencing the same.

All insurance certificates shall state that the insurance carrier will give Symbiont thirty (30) days notice of any cancellation or material change of the policies.

Any deductibles or self-insured retentions must be declared to and approved by Symbiont. At the option of Symbiont, either: the insurer shall reduce to a maximum of \$50,000 or eliminate such deductibles or self-insured retentions as respects Symbiont, its officials and employees or provide satisfactory financial evidence to Symbiont of the Subconsultant's ability to fund the deductible amount if necessary. Any self-insured retention or deductible amount on the policy shall not reduce the amount of collectible limits of liability.

If any of the aforementioned insurance policies are written on a claims-made basis, the Subconsultant warrants that continuous coverage will be maintained or an extended discovery period will be exercised for a period of one year-five years beginning from the time the work under this contract is completed.

The insurance companies providing the coverage shall maintain a minimum A.M. Best financial rating of at least A—.

Subconsultant agrees to indemnify and save Symbiont harmless from and against all liability, loss or expense (including costs and attorneys' fees) arising out of or in consequence of Subconsultant's failure to obtain the required coverages or to meet the other insurance requirements of this Agreement.

Neither Symbiont's failure to require or to insist upon certificates or other evidence of insurance, nor Symbiont's acceptance of a certificate or other evidence of insurance showing a variance from the specified coverage, changes or waives Subconsultant's obligation to comply with the insurance specifications of this Agreement.

Symbiont may, at its sole discretion, withhold payment to Subconsultant for failure of to provide a Certificate of Insurance. Symbiont's payment to Subconsultant shall not change or waive Subconsultant's obligation to comply with the insurance specifications of this Agreement.

Article 14. Indemnification

Symbiont and the Subconsultant mutually agree, to the fullest extent permitted by law, to indemnify and hold each other harmless from any and all damage, liability or cost (including reasonable attorneys' fees and costs of defense) arising from their own negligent acts, errors or omissions in the performance of their services/work under this Agreement, to the extent that each party is responsible for such damages and losses on a comparative basis of fault.

Subconsultant agrees, to the fullest extent permitted by law, to indemnify and hold Symbiont harmless from any and all damage, liability or cost (including reasonable attorneys' fees and costs of defense) arising from any lower-tier subconsultant's or subcontractor's negligent acts, errors or omissions in the performance of their services/work under this Agreement, to the extent that such lower-tier subconsultant or subcontractor is responsible for such damages and losses.

**Article 15. Safety**

Subconsultant shall take reasonable precautions to perform the Scope of Work in a safe manner and is responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Subconsultant's work. Subconsultant will be solely responsible for working conditions on those portions of the Project job site reasonably within Subconsultant's work area, including the safety of all persons and property during performance of the Scope of Work, in addition to providing any and all safety equipment or articles necessary to protect its employees and agents and to comply with applicable OSHA regulations and requirements of the Owner of the Project job site. Any monitoring of Subconsultant's procedures conducted by Symbiont will not include a review of the adequacy of Subconsultant's safety measures in, on, adjacent to, or near any Project job site. Symbiont's responsibility for Project job site safety is limited solely to its own employees and the provision of appropriate training, supervision and personal protective equipment for those employees.

An expression of concern by Symbiont regarding the Subconsultant's safety practices shall not be construed as usurping the responsibility of the Subconsultant for the safety of the Subconsultant's work.

Article 16. Assignment/Lower-Tier Subconsultants

This Agreement and the rights and duties hereunder shall not be assigned, subcontracted, or transferred by Subconsultant, in whole or in part, without Symbiont's prior written approval. Subconsultant shall inform Symbiont in writing of the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for any portion of the work subject to this Agreement. If Symbiont objects to any lower-tier subconsultant or supplier, such objection will be given in writing to Subconsultant within a reasonable period of time, specifying the basis for the objection. Subconsultant shall not contract with a lower-tier subconsultant or supplier reasonably objected to by Symbiont.

Prior to Symbiont's payment of progress payments and/or the final payment to Subconsultant, Subconsultant shall deliver proof satisfactory to Symbiont of full payment to all lower-tier subconsultants, suppliers, and for all labor, materials, supplies, machinery and equipment furnished for or used in performance of the Scope of Work identified in this Agreement. Such proof will include all necessary releases or waivers of liens supported by affidavits, all satisfactory to Symbiont, establishing that all liens and rights to claim liens which could arise out of performance of this Agreement, have been waived.

So long as Subcontractor has been paid on a timely basis for un-contested completed work. Subconsultant shall take all actions within its control (including the execution, acknowledgement, delivery and filing of such waivers, releases and other documents) to prevent any mechanics' or materialmen's liens or any other liens or encumbrances from being filed in respect of or placed upon any real property or improvements owned or leased by Symbiont or Owner as a result of or in connection with any work performed by or any other action or omission on the part of Subconsultant or any lower-tier subconsultants or suppliers or other person claiming by, through or under Subconsultant including, but not limited to, any liens or encumbrances arising by reason of the construction, use, occupancy, maintenance, repair or rebuilding of any such property or improvements or the furnishing of any labor, materials or supplies. If, notwithstanding the immediately preceding sentence, any mechanics' or materialmen's lien or other lien or encumbrance is filed in respect of or placed upon such property or improvements and if Subconsultant does not cause such lien or encumbrance to be fully and effectively released and discharged, or does not cause such lien or encumbrance to be bonded over in a manner acceptable to Symbiont and Owner, Symbiont shall be entitled, without prejudice to any other rights or remedies available to it, to pay directly to the holder of such lien or encumbrance all sums necessary to obtain its immediate release and discharge and to credit all sums so paid against any amount due or to become due to Subconsultant under or in connection with this Agreement or any other agreement with Subconsultant.

Article 17. Communication with Owner

All of the Subconsultant's written or verbal communication with or to the Owner, or with federal, state, or local agencies, relative to work under this Agreement must be through or with knowledge of Symbiont.

Article 18. Copies of Data

Unless otherwise called for in the Scope of Work, one legible copy each of all notes, field notes, drawings, prints, and plans prepared under the terms of the Subconsulting Agreement shall be delivered by the Subconsultant to Symbiont upon completion of the Scope of Work or termination of the Agreement.



Article 19. Soliciting Employment

Neither party to this Subconsultant Agreement shall solicit an employee of the other party, nor hire or make an offer of employment to an employee of the other party, without prior written consent of the other party, during the time this Subconsultant Agreement is in effect.

Article 20. Waiver

No waiver by Symbiont of any term or condition set forth herein, whether by conduct or otherwise, in any one or more instances, shall be deemed or construed as a further or continuing waiver of any such term, condition or breach or a waiver of any other term, condition or breach.

Article 21. Headings

The subject headings in this Agreement are for convenience only and are not determinative of the substance of the subject clause.

Article 22. Entire Agreement

The parties agree that this Agreement, together with Attachment 1, represents the sole and entire integrated Agreement of the parties with respect to the project and supersedes all prior communications, negotiations, representations, quotations, offers or agreements, either written or oral between the parties hereto, with respect to the subject matter hereof, and no agreement or understanding varying or extending this Agreement shall be binding upon either Party, other than by a written agreement signed by both Subconsultant and Symbiont. If additional documents represent the agreement of the parties, such documents must be itemized, referencing this Article 22, in Attachment 1.

Article 23. Severability

If any provision or part of a provision of this Agreement is declared to be invalid by any tribunal of competent jurisdiction, such part shall be deemed automatically adjusted, if possible, to conform to the requirements for validity, but if such adjustment is not possible, it shall be deemed deleted from this Agreement as though it had never been included herein. In either case, the balance of any such provision and of this Agreement shall remain in full force and effect.

Article 24. Change Orders

Any amendments to this Agreement shall be executed by means of a written change order, signed by the Subconsultant and Symbiont. Changes to the Agreement will not become effective until the change order has been signed by both parties. The change order will document the specific changes to the Agreement along with any resulting adjustment in cost and/or schedule.

IN WITNESS WHEREOF, the parties have executed this Agreement including Attachment 1, which includes a description of the scope of work, schedule, method of compensation, and Supplemental Terms and Conditions of Agreement (if any), and is incorporated by reference into these Terms and Conditions of Agreement. This Agreement may be executed in counterparts, each of which shall constitute an original, but both of which when taken together shall constitute one and the same agreement. The parties agree that a counterpart of this Agreement may be executed by a party and then delivered to the other party by facsimile or other electronic means, and such facsimile or other electronic copy will constitute an original counterpart. The signatories below represent that they are duly authorized by the business entities they represent to sign this Agreement. The effective date of this Agreement is the later of the signature dates below.



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Subconsultant: Ground Improvement Services, Inc.

	Chief Operating Officer	2/8/18
Name: Kenneth J. Leahy	Title	Date

Symbiont Design-Build, LLC:

	Vice President	02/08/18
Name:	Title	Date

1



FORM SDB-3 02-2016

**ATTACHMENT 1
TO SYMBIONT® DESIGN-BUILD, LLC
SUBCONSULTANT
PROFESSIONAL SERVICES AGREEMENT**

Project Name	Trenton Biogas Digester Foundation Design and Permitting Assistance
Project No.	DB180999
Subcontractor	Ground Improvement Services, Inc. PO Box 918 Purcellville, VA 20134 <u>Steward Station, PM</u> <u>703-869-7495</u> <u>Attn: Kurt Levine, P.E.</u> <u>862-763-0468</u>
Owner	Trenton Biogas, LLC
Site Location	Trenton Biogas 1600 Lambertson Road Trenton, NJ 08611
Scope of Work	Scope of work shall consist of soil improvement system design services as summarized in Ground Improvement Services, Inc. quote dated 01/30/18 for three (3) digester tanks and one buffer tank for the proposed Trenton Biogas Facility in Trenton, NJ. All design documents shall be stamped by a registered professional engineer licensed in the state of New Jersey. The deliverable for this project shall be stamped design drawings and calculations for use by the Owner to obtain a construction permit from the local permitting authority.
Compensation	Lump sum fee of \$47,800 Provide invoices to the attention of Brian Till that identify the Symbiont project number DB180999 and delineates the scope of work provided.
Schedule	Time is of the essence. All design work must be completed within two weeks of receipt of final design loads.
Supplemental Conditions	<ol style="list-style-type: none"> 1. The Owner is an intended third-party beneficiary to this Agreement. This Agreement is assignable to Owner, without further consent or approval by Subconsultant, upon Owner's written request following default by Symbiont or termination or expiration of the Contract between Owner and Symbiont. 2. Subconsultant shall enter into a new contract directly with the Owner on the same terms and conditions as this Agreement in the event that any trustee in bankruptcy for Symbiont rejects this Agreement, or the Subconsultant terminates this Agreement as a result of the bankruptcy of Symbiont.

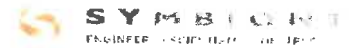


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	<p>3. Subconsultant shall provide reasonable cooperation and further assurances in connection with Owner's efforts to obtain debt and/or equity financing for the Project facility as Owner shall reasonably request and shall use commercially reasonable efforts to cause its lower-tier subcontractors to do the same. Without limiting the foregoing, within twenty (20) business days after Owner's written request, Subconsultant shall execute and deliver to Owner a written consent in a form satisfactory to Owner, and such consents to assignment and related agreements as shall be typical in project finance transactions on the form customarily used by such financing parties, for the benefit of Owner's financing parties, in either case together with such changes as the financing parties shall reasonably request. Any costs (including reasonable attorney's fees) incurred by Subconsultant in connection with complying with the terms of this provision, including any legal opinions required to support any such financing party consents, shall be at Owner's costs and shall be in addition to the Compensation in Attachment 1 of this Agreement.</p> <p>4. Article 16 – Insurance. Item F, Professional Liability. Subconsultant shall provide an insurance certificate with \$5,000,000 per occurrence of Professional Liability Insurance.</p>
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EXHIBIT E

SYMBIONT/SUBCONTRACTOR CHANGE ORDER



DISTRIBUTION TO:


Symbiont PM _____

Contractor _____

Central File _____

PROJECT: Trenton Biogas
(Name & Address)1600 Lambertson RoadTrenton, NJ 08611TO CONTRACTOR: Ground Improvement Services
(Name & Address)PO Box 918Purcellville, VA 20134CHANGE ORDER NUMBER: 1INITIATION DATE: 5/30/2018PROJECT MANAGER: Brian TillCONTRACT SERVICES: Soil ImprovementCONTRACT DATE: 2/8/2015

You are directed to make the following changes in this Contract:

Grouted impact pier foundation system construction per Ground Improvement Services design documents dated 4/4/18 and Ground Improvement Services proposal No. 7820 RI dated 1/20/18. Scope of work includes mobilization, modulus test, three (3) digester RI elements, and one (1) buffer tank RI elements. 1/30/18 

Not valid until signed by the Symbiont Representative and CONTRACTOR.

CONTRACTOR agrees that this Change Order includes any and all costs associated with or resulting from the change ordered herein, including all impacts, delays, and accelerated costs. Other than the dollar amount and time allowance listed above, there shall be no other dollar or time compensation as a result of this Change Order.

The original Contract Price.....	\$	47,800.00
Net change by previously authorized Change Orders.....	\$	-
Net increase / (decrease) of this Change Order.....	\$	551,110.00
Revised Contract Price including this Change Order.....	\$	598,910.00
The Contract Time will be (increased)/(decreased) by.....	N/A	Days
The revised Date of Substantial Completion is.....	N/A	

Ground Improvement Services

CONTRACTOR (Company Name)

PO Box 918
Purcellville, VA 20134
ADDRESS

By (Signature)

6/6/18
DATE

Pete Sacripanti, CFO

SYMBIONT

6737 West Washington Street, Suite 3440
West Allis, Wisconsin 53214
414-291-8840
Fax: 414-291-8841
ADDRESS

By (Signature)

05/30/18
DATE

TRUSTED FOR GOOD REASON.

EXHIBIT F

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY**

<p>SYMBIONT SCIENCE, ENGINEERING AND CONSTRUCTION, INC.; ZURICH AMERICAN INSURANCE COMPANY a/s/o Symbiont Science, Engineering and Construction, Inc.; AMERICAN GUARANTEE AND LIABILITY INSURANCE COMPANY, a/s/o Symbiont Science, Engineering and Construction, Inc. and STEADFAST INSURANCE COMPANY a/s/o Symbiont Science, Engineering and Construction, Inc.,</p> <p>Plaintiffs</p> <p>vs.</p> <p>GROUND IMPROVEMENT SERVICES, INC.; JOHN DOES 1-10, (fictitious parties) and ABC COMPANIES 1-10 (fictitious parties); GEOSTRUCTURES OF VIRGINIA, INC.</p> <p>Defendants.</p>	<p>CIVIL ACTION NO. 3:22-04905</p> <p>SECOND AMENDED COMPLAINT WITH JURY DEMAND FILED WITH CONSENT OF OPPOSING COUNSEL PURSUANT TO FRCP 15(a)(2)</p>
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Plaintiffs, Symbiont Science, Engineering and Construction, Inc.; Steadfast Insurance Company, as subrogee of Symbiont Science, Engineering and Construction, Inc.; American Guarantee and Liability Insurance Company, as subrogee of Symbiont Science, Engineering and Construction, Inc. and Zurich American Insurance Company, as subrogee of Symbiont Science, Engineering and Construction, Inc., by and through their counsel, and by way of Complaint, state as follows:

PARTIES

1. Plaintiff, Symbiont Science, Engineering and Construction, Inc. (“Symbiont”) is a corporation organized and existing under the laws of the State of Wisconsin with its principal place of business at 6737 W. Washington Street, Suite 3500, West Allis, Wisconsin 53214.

2. Plaintiff, Steadfast Insurance Company (“Steadfast”) is an Illinois corporation engaged in the insurance business with a statutory home office located at 1299 Zurich Way, Schaumburg, Illinois 60196, and its principal place of business located at 1299 Zurich Way, Schaumburg, Illinois 60196. Steadfast operates as a non-admitted surplus lines insurer in New Jersey and is authorized to do business in New Jersey.

3. American Guarantee and Liability Insurance Company (“AGLIC”) is a New York corporation engaged in the insurance business with a statutory home office located at 4 World Trade Center, 150 Greenwich Street, New York, NY 10007, and its principal place of business located at 1299 Zurich Way, Schaumburg, Illinois 60196. AGLIC is authorized to transact business and has transacted business in New Jersey.

4. Plaintiff, Zurich American Insurance Company (hereinafter “Zurich”) is a New York corporation company engaged in the insurance business with a statutory home office and principal place of business located at 1299 Zurich Way, Schaumburg, IL 60196. Zurich is authorized to transact business and has transacted business in New Jersey.

5. Steadfast, AGLIC and Zurich are hereinafter collectively referred to as Zurich.

6. Defendant, Ground Improvement Services, Inc. (“GIS”), is corporation organized under the laws of the Commonwealth of Pennsylvania with its principal place of business located at 413 Browning Court, Purcellville, Virginia.

7. GIS is a consultant that provides, among other things, soil improvement design and construction services.

8. Defendant, GeoStructures, Inc. of Virginia, Inc. (“GeoStructures”) is a corporation organized under the laws of the Commonwealth of Virginia with its principal place of business located at 413 Browning Court, Purcellville, Virginia.

9. GeoStructures is a consultant that provides professional services in the geotechnical engineering and construction monitoring field including soil and site inspection and assessment of soil conditions.

10. John Does 1 – 10 and ABC Companies 1 – 10 are fictitious parties and Defendants who are entities and/or individuals who have yet to be identified by Plaintiffs as Defendants but whose identity as Defendants may be revealed during the period of discovery that will occur relative to this action and who may be liable for Plaintiffs’ damages as referenced herein. Such individuals/entities may include but are not necessarily limited to manufacturers, brokers, salespeople, agents, managers, owners, technicians, shareholders, members, independent contractors, customer service representatives, inspectors, engineers, designers, architects and the like.

VENUE

11. Jurisdiction of this Court arises under 28 U.S.C. §1332 as the matter at issue involves claims between citizens of different States, and there is complete diversity and the amount in controversy exceeds \$75,000.00.

12. Venue lies properly in this District pursuant to 28 U.S.C. §1391(b) in that the events giving rise to the claims occurred in Mercer County, New Jersey and the within action is properly brought in the United States District Court for the District of New Jersey.

FACTS

13. Trenton Biogas, LLC is the owner of a Biogas Production Facility (the “Facility”) located in Trenton, New Jersey.

14. Symbiont is an engineering, consulting, and design-build firm focused on environmental and process projects.

15. On December 19, 2018, Symbiont entered into an Engineering, Procurement and Construction Contract (“EPC Contract”) with Trenton Biogas pursuant to which Symbiont provided to Trenton certain engineering, procurement, and construction management services in connection with the construction of an anaerobic digestion and biogas production facility in Trenton, New Jersey (“the Facility”).

16. The Facility was designed to process food products, pharmaceutical grade alcohols, and glycerin to produce methane, compost and fertilizer.

17. Symbiont, as a full-service engineering and construction services contractor, had the technical capabilities to provide services to Trenton, including engineering, procurement, and construction management services at the Facility and start-up assistance with respect to operation of the Facility.

18. The Facility construction included the construction of four (4) tanks, i.e., three (3) digester tanks and one (1) buffer tank.

19. The three (3) digester tanks are 1.3 million gallon above ground storage tanks with a diameter of 56 feet each and the buffer tank is a 467,000 gallon above ground storage tank with a diameter of 36.42 feet.

20. On January 5, 2018, GZA GeoEnvironmental, Inc. (“GZA”) issued a Geotechnical Engineering Evaluation Report with regard to the Facility property.

21. The GZA report indicated that in order to construct the facility the ground would need to be stabilized and reinforced due to the existing near surface fill layer being generally unsuitable for support of foundations.

22. On February 8, 2018, GIS entered into a contract with Symbiont to provide soil improvement design services. See Exhibit A, Symbiont/GIS Contract.

23. Pursuant to the Symbiont/GIS Contract, GIS was to design the soil improvement system with a maximum Long Term Settlement under the digester and buffer tanks of up to 2 inches. See Exhibit B, Scope of Work, 2.1.4.3.

24. Pursuant to the Symbiont/GIS Contract, GIS was to design the soil improvement system with a maximum differential settlement of $\frac{1}{2}$ inch. See Exhibit B, Scope of Work, 2.1.4.4.

25. GIS engaged the services of GeoStructures to effectuate the necessary design of the soil improvement system.

26. The Symbiont/GIS Contract provides that GIS was to obtain insurance naming both Symbiont and the Owner, Trenton Biogas, as additional insureds on its Commercial General Liability Policy(ies), Contractor's Pollution Policy(ies), Automobile Liability Policy(ies) and Excess/Umbrella Liability Policy(ies). See Exhibit A, Article 13. Insurance.

27. The Symbiont/GIS Contract provides that GIS "agrees to indemnify and save Symbiont harmless from and against all liability, loss or expense, including costs and attorney's fees, arising out of or in consequence of [GIS's] failure to obtain the required coverages or to meet the other insurance requirements of this Agreement. Id.

28. The Symbiont/GIS Contract contains the following Indemnification clause:

Subconsultant [GIS] agrees, to the fullest extent permitted by law to indemnify and hold Symbiont harmless from any and all damage, liability or cost (including reasonable attorneys' fees and costs of defense) arising from any lower tier subconsultant's or subcontractor's negligent acts, errors or omissions in the performance of their services/work under this Agreement, to the extent that such lower-tier subconsultant or subcontractor is responsible for such damages and losses.

Exhibit A, Article 14. Indemnification.

29. Pursuant to the Symbiont/GIS Contract, all disputes thereunder are to be brought in any state or federal court located in New Jersey. See Exhibit A, Article 11. Dispute Resolution.

30. Further, the Symbiont/GIS Contract is governed and construed in accordance with the laws of the State of New Jersey, without reference to conflicts of law principals. See Exhibit A, Article 12, Choice of Law.

31. On May 30, 2018, Symbiont and GIS entered into a change order for the “Grouted impact pier foundation system construction per Ground Improvement Services design documents dated 4/4/18 and Ground Improvement Services proposal No. 7820 RI dated 1/30/18. The scope of Work includes mobilization, modulus testing, three (3) digester RI elements and one (1) buffer tank RI elements. See Exhibit C, Symbiont/Subcontractor Change Order.

32. GIS performed the implementation of the soil improvements at the property.

33. The ground improvement pier construction occurred through July 2018 and was completed in mid-August 2018. As part of the construction scope of work, GIS completed a load test on an installed test pier.

34. On September 5, 2018, Symbiont received correspondence from GIS that indicated that the load test showed compliance with the settlement performance requirements.

35. Immediately following the installation of the ground improvement pier system, another subcontractor constructed the four tank concrete floor slabs, under a direct contract with Symbiont, followed by the erection of bolted steel-based tanks supplied by Schumann Tanks under a direct contract with Trenton Biogas.

36. From March 2019 through May 2019 the tanks were subject to a water test, i.e., each tank was filled with water to its operating capacity.

37. Upon the initial filling of the tanks, indications of foundation settlement were observed through buckling of the elevated steel walkways spanning between the tanks.

38. On May 2, 2019, Symbiont notified GIS of the settlement of the tanks and the observed damages.

39. In June 2019, during several conversations between Symbiont and GIS, GIS maintained that following the initial tank filling and loading, settlement should cease.

40. After the water test, the tanks were drained, removing the load on the foundation system.

41. Through the winter of 2019-2020, Trenton Biogas initiated operations slowly bringing the tanks into service.

42. When the tanks reached full operating capacity in April, 2020 the settlement resumed.

43. In May 2020, further discussions between Symbiont and GIS commenced.

44. At that time, based on the recommendation of the tank supplier, Digesters 1 and 2 were required to operate at 70% tank level to prevent a catastrophic tank rupture due to the excessive differential settlement, and the tank and mixer suppliers recommended operating the mixers in Digesters 1 and 2 at 30% of normal operating speed to prevent mixer failure.

45. As settlement continued, stress was observed on the ladder and intermediate platform structures between Digesters 1 and 2 which provided access and egress to/from the roof mounted walkways.

46. In July 2020 the ladder and intermediate platform structures were removed and replaced with temporary scaffolding and ladders to prevent damage to the structure while

maintaining the required operational access. Installation of the temporary scaffolding and ladder system was a necessary life safety measure.

47. From approximately June 2020 through November 2021, Symbiont was providing GIS with survey data collected approximately every two (2) weeks documenting the continued settlement.

48. As of June 2020, Digesters 1 and 2 had each settled five and a half (5 $\frac{1}{2}$) inches, exceeding the ultimate allowable settlement by almost 200 percent.

49. GIS returned to the site in July 2020 and performed additional soil borings. In a letter dated September 21, 2020, GeoStructures, GIS's subsidiary, stated that data from the additional borings indicated that Digesters 1 and 2 should be expected to settle more than the two (2) inches allowed by GIS contract with Symbiont.

50. On November 10, 2020, Trenton Biogas informed Symbiont that due to continued tank settlement, the mixer in Digester 1 was out of level tolerance and required re-leveling to prevent further damage. Symbiont contacted Schumann, who furnished and installed the mixer, to obtain the recommended procedure for re-leveling the mixer.

51. Due to GIS' failure to take responsibility for their contractual obligations, the mixer levelling has not yet occurred.

52. The differential settlement to date is in the range of six (6) to seven (7) inches.

53. Further differential settlement in Digesters 1 and 2 subsided as a result of reducing tank levels to 70% but likely still continues.

54. Trenton Biogas placed Symbiont on notice of a dispute, as defined in the EPC Contract, relating to the settlement of the digester tanks and buffer tank.

55. Pursuant to the Article 20 of the EPC Contract, Trenton Biogas and Symbiont engaged in mediation to resolve Trenton Biogas' claims asserted against Symbiont in regard to the settlement of the digester tanks and buffer tank.

56. A settlement was reached between Trenton Biogas and Symbiont on February 23, 2022 whereby Symbiont agreed to pay to Trenton Biogas the total sum of \$11,715,000.00 in exchange for a full release of all of Trenton Biogas' claims relating to the settlement of the digester tanks and buffer tank.

57. Zurich undertook financial responsibility for the loss and claims against Symbiont pursuant to its policies of insurance with Symbiont.

58. Zurich has expended over \$11,715, 000.00 in connection with the claims relating to the settlement of the digester tanks and buffer tank.

59. Zurich is subrogated to all the rights and remedies that Symbiont has against GIS to the extent of the payments made by Zurich to or on behalf of Symbiont in settlement of the claims relating to the settlement of the digester tanks and buffer tank as a result of the actions, inactions, omissions and failures of GIS and the other defendants.

60. Symbiont sustained and incurred additional losses, costs and expenses beyond what were paid by Zurich, in excess of \$3,285,000.00, and Symbiont faces additional claims by Trenton Biogas, totaling in excess of \$4,000,000.00 for alleged damages that were also caused by the actions, inactions and failure of GIS and the other defendants.

61. The additional losses, costs and expenses sustained and incurred by Symbiont were a direct and proximate result of the foregoing acts and omissions of GIS and the other defendants.

FIRST COUNT
Plaintiffs v. GIS
(Negligence/Professional Malpractice)

62. Paragraphs 1 through 61 are repeated as though fully set forth at length herein.

63. GIS provided design, planning, engineering, supervisory, and other services with regard to the development and construction of a soil improvement system at the Facility, and owed the Plaintiffs a duty to exercise that degree of reasonable care, technical skill, ability, and diligence ordinarily exercised by engineers and engineering firms in similar circumstances and in the planning, designing, supervising, reviewing, inspecting, monitoring, managing, and in otherwise providing architectural and engineering services in the development and construction of the soil improvement system at the Facility.

64. Upon information and belief, John Does 1 – 10 and ABC Companies 1 – 10 provided general contracting, supervisory, site management, construction, installation, oversight, and related services and/or materials with regard to the development and construction of the Facility, and owed Plaintiffs a duty to exercise that degree of reasonable care that ordinarily would be exercised by ordinary, prudent persons in similar circumstances while providing such services relating to the development and construction of the Facility.

65. There existed numerous defects and deficiencies in the design and construction of the Facility.

66. GIS breached the duties of care that it each owed to Plaintiffs and were negligent in that it failed to properly design, plan, supervise, manage, install, construct, and/or supply adequate services and/or materials for and otherwise breached its duties with respect to the design, development and construction of the soil improvement system at the Facility and is responsible for the numerous defects and deficiencies.

67. As a direct, proximate and foreseeable result of the negligence of GIS, the Plaintiffs have been injured in that portions of the Facility and/or its subcomponents that incurred and sustained damages including, but not limited to, the substantial expenses and costs incurred to repair and/or replace the defects and deficiencies.

WHEREFORE, Plaintiffs demand judgment against GIS, jointly, severally and in the alternative for compensatory and consequential damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

SECOND COUNT
Plaintiffs v. GIS
(Breach of Contract, Contractual Indemnification)

68. Paragraphs 1 through 67 are repeated as though fully set forth at length herein.

69. Pursuant to the express terms of the contracts between GIS and Symbiont, GIS expressly agreed to indemnify Symbiont and hold it, its agents and employees harmless from and against any and all claims arising from any of GIS's lower tier subconsultant's or subcontractor's negligent acts, errors or omissions in the performance of their services/work under this GIS/Symbiont Agreement, to the extent that it or such lower-tier subconsultant or subcontractor is responsible for such damages and losses.

70. Symbiont and Zurich as subrogee of Symbiont, are entitled to contractual indemnification from GIS in an amount in excess of \$15,000,000.00 as well as attorney fees and costs incurred in defending the claims by Trenton Biogas and in bringing this action.

WHEREFORE, Plaintiffs demand judgment against GIS for compensatory and consequential damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

THIRD COUNT
Plaintiffs v. GIS
(Breach of Express Warranty)

71. Paragraphs 1 through 70 are repeated as though fully set forth at length herein.

72. GIS expressly warranted to Symbiont that all materials and equipment furnished by GIS in connection with the construction of the soil improvements, and all work performed by GIS, would be of good quality, free of faults and defects, and in conformance with the contract documents.

73. GIS also expressly warranted that the tanks would not settle more than 2 inches or have differential settlement of more than ½ inch.

74. GIS has breached their express warranties with regard to their work and materials.

75. Symbiont and Zurich as subrogee of Symbiont, have been damaged by such breaches in that it was exposed to significant liability and incurred substantial costs and counsel fees.

WHEREFORE, Plaintiffs demand judgment against GIS for compensatory and consequential damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

FOURTH COUNT
Plaintiffs v. GIS
(Breach of Implied Warranty)

76. Paragraphs 1 through 75 are repeated as though fully set forth at length herein.

77. GIS impliedly warranted to Symbiont that it possessed the skill, experience, training and expertise to perform the work in accordance with the care and skill customary in the construction industry, and that, if selected by Symbiont, it would, in fact, use such care and skill in performing their work at the Facility.

78. GIS also impliedly warranted to Symbiont that its work would be of good quality, free of defects, in conformity with contract documents, safe, and fit for the intended purposes of at the Facility.

79. GIS has breached their implied warranties.

80. Symbiont and Zurich as subrogee of Symbiont, have been damaged by such breaches in that it was been exposed to significant liability in an amount in excess of \$15,000,000.00 and have incurred substantial costs and counsel fees.

WHEREFORE, Plaintiffs demands judgment against GIS for compensatory and consequential damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

FIFTH COUNT
Plaintiffs v. GIS
(Breach of Contract, Procurement of Insurance)

81. Paragraphs 1 through 80 are repeated as though fully set forth at length herein.

82. Pursuant to the express terms of the contracts between GIS and Symbiont, GIS expressly agreed to procure insurance naming Symbiont as an additional insured.

83. GIS failed to do so.

84. Symbiont and Zurich as subrogee of Symbiont, are entitled to damages from GIS in an amount in excess of \$15,000,000.00 that is as a result of GIS's breach of its express contractual insurance provision obligation.

WHEREFORE, Plaintiffs demand judgment against Symbiont for compensatory and consequential damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

SIXTH COUNT
Plaintiffs v. GIS
(Common Law Indemnification)

85. Paragraphs 1 through 84 are repeated as though fully set forth at length herein.

86. Plaintiffs assert the damages sustained by the Plaintiff were the proximate result of the negligence, wrongdoing, and/or defective workmanship and products and materials provided by GIS, which negligence, wrongdoing, and/or defective work and material were the primary and active cause of the Plaintiffs' alleged damages.

87. Plaintiffs are entitled to common law indemnification from GIS in an amount in excess of \$15,000,000.00 plus attorney's fees and costs as a result of its wrongdoing.

WHEREFORE, Plaintiffs demands judgment against GIS for compensatory and consequential damages, attorneys' fees, costs, interest, and such other relief as the Court deems just and equitable.

SEVENTH COUNT
Plaintiffs v. GeoStructures
(Negligence/Professional Malpractice)

88. Paragraphs 1 through 87 are repeated as though fully set forth at length herein.

89. GeoStructures provided engineering, surveying, assessment, testing and related services with regard to the necessary implementation of the soil improvements at the facility for purposes of construction and installation of the three digester tanks and one buffer tank, and owed the Plaintiffs a duty to exercise that degree of reasonable care, technical skill, ability, and diligence ordinarily exercised by engineers and soil consulting firms in similar circumstances including in the services provided and work described above and to provide said services and perform said work in a fair and reasonable manner.

90. There existed numerous defects and deficiencies in the design and construction of the Facility.

91. GeoStructures performed and provided the services and work and owed Plaintiffs a duty to exercise that degree of reasonable care that ordinarily would be exercised by ordinary, prudent persons in similar circumstances while providing said work and services.

92. As a direct, proximate and foreseeable result of the negligence of GeoStructures, , the Plaintiffs have been injured in that portions of the Facility and/or its subcomponents that incurred and sustained damages including, but not limited, the substantial expenses and costs incurred to repair and/or replace the defects and deficiencies.

WHEREFORE, Plaintiffs demand judgment against GeoStructures, jointly, severely and in the alternative for compensatory and consequential damages, attorneys' fees, costs, interest and such other relief as the Court deems just and equitable.

EIGHTH COUNT
Plaintiffs v. GeoStructures
(Common Law Indemnification)

93. Paragraphs 1 through 92 are repeated as though fully set forth at length herein.

94. Plaintiffs assert that the damages sustained by the Plaintiffs were the proximate result of the negligence, wrongdoing and/or defective workmanship and products and materials provided by GeoStructures, which negligence, wrongdoing and/or defective working material were the primary and active cause of the Plaintiffs' damages.

95. Plaintiffs are entitled to common law indemnification from GeoStructures in an amount in excess of \$15,000,000.00 plus attorneys' fees and costs as a result of its wrongdoing.

NINTH COUNT
Plaintiffs v. John Does 1 – 10 and ABC Companies 1 – 10
(Negligence/Professional Malpractice)

96. Paragraphs 1 through 95 are repeated as though fully set forth at length herein.

97. John Does 1 – 10 and ABC Companies 1 – 10 provided general contracting, supervisory, site management, construction, installation, oversight, and related services and/or

work and/or goods and/or materials with regard to the development and construction of the Facility including for purposes of construction and installation of the three digester tanks and one buffer tank, and owed the Plaintiffs a duty to exercise that degree of reasonable care, technical skill, ability, and diligence ordinarily exercised by entities and persons who perform or provide said services, work, goods, and/or materials in similar circumstances including in the services, work, goods, and/or materials described above and to do so in a fair and reasonable manner.

98. There existed numerous defects and deficiencies in the design and construction of the Facility.

99. John Does 1 – 10 and ABC Companies 1 – 10 performed and provided the services, work, goods, and/or materials described above and owed Plaintiffs a duty to exercise that degree of reasonable care that ordinarily would be exercised by ordinary, prudent persons in similar circumstances while performing and/or providing said services, work, goods, and/or materials.

100. As a direct, proximate and foreseeable result of the negligence of John Does 1 – 10 and ABC Companies 1 – 10, the Plaintiffs have been injured in that portions of the Facility and/or its subcomponents that incurred and sustained damages including, but not limited, the substantial expenses and costs incurred to repair and/or replace the defects and deficiencies.

WHEREFORE, Plaintiffs demand judgment against John Does 1 – 10 and ABC Companies 1 – 10, jointly, severely and in the alternative for compensatory and consequential damages, attorneys' fees, costs, interest and such other relief as the Court deems just and equitable.

TENTH COUNT
Plaintiffs v. John Does 1 – 10 and ABC Companies 1 – 10
(Common Law Indemnification)

101. Paragraphs 1 through 100 are repeated as though fully set forth at length herein.

102. Plaintiffs assert that the damages sustained by the Plaintiffs were the proximate result of the negligence, wrongdoing and/or defective or deficient service, workmanship, goods and/or materials performed and/or provided by John Does 1 – 10 and ABC Companies 1 – 10, which negligence, wrongdoing and/or deficient or defective goods and/or materials the primary and active cause of the Plaintiffs’ damages.

103. Plaintiffs are entitled to common law indemnification from John Does 1 – 10 and ABC Companies 1 – 10 in an amount in excess of \$15,000,000.00 plus attorneys’ fees and costs as a result of its wrongdoing.

DEMAND FOR JUDGMENT

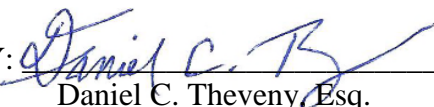
WHEREFORE, Plaintiffs demand judgment against the Defendants as follows:

1. That judgment be entered the Defendants;
2. That the Defendants be held jointly and severally liable to Plaintiffs to the fullest extent allowed by law;
3. For an award damages in excess of \$15,000,000.00 according to Plaintiffs’ proof at trial;
4. For an award of attorney’s fees to the fullest extent allowed by law ;
5. For and award of the costs of suit; and
6. For such other and further relief to which Plaintiff may be justly entitled.

JURY DEMAND

Plaintiffs hereby demand a trial by jury as to all issues so triable raised herein.

COZEN O'CONNOR PC

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Attorneys for Plaintiff Symbiont Science,

Engineering and Construction, LLC.

EXHIBIT “A”



FORM SDB-3 02-2016

**SYMBIONT® DESIGN-BUILD, LLC
SUBCONSULTANT
PROFESSIONAL SERVICES AGREEMENT**

THIS AGREEMENT is entered into this 8th day of February, 2018, by and between Symbiont Design-Build, LLC (Symbiont) and Ground Improvement Services, Inc. (Subconsultant).

WHEREAS, Symbiont has entered into a written agreement, (the Contract) with Trenton Biogas, LLC (the Owner) for Digester Foundation Design and Permitting Services (the Project).

WHEREAS, Subconsultant represents that it can provide soil improvement design services, described in the Scope of Work of Attachment 1.

Symbiont and the Subconsultant have agreed that the Subconsultant will perform the following services, which are part of the Contract identified above. The services covered by this Agreement will be performed in accordance with the provisions included within this form and any attachments or schedules.

Article 1. Scope of Work

Subconsultant shall perform the services, specified in the Scope of Work section of Attachment 1, which are reasonably necessary and appropriate for the effective and prompt fulfillment of the Subconsultant's obligations under this Agreement. The relationship between the Subconsultant and Symbiont created under this Agreement is that of principal and independent contractor. Services provided by the Subconsultant shall be subject to the provisions of this Agreement including these general conditions, and supplemental conditions incorporated herein, and any written amendments agreed to by both parties.

Symbiont may adjust the Scope of Work by either adding to or deleting from the services to be performed. If such adjustment increases or decreases the cost or time required for the Subconsultant's Scope of Work, adjusted compensation and/or time will be mutually agreed upon in writing. Additional services provided by the Subconsultant will be entitled to additional compensation or extension of time only as authorized in writing by Symbiont. (See Article 24. Change Orders.)

Article 2. Compensation

Symbiont shall pay the Subconsultant for work performed under this Agreement in accordance with the provisions described herein and in the Compensation section of Attachment 1.

Subconsultant shall submit invoices to Symbiont in accordance with the Compensation section of Attachment 1 and no more frequently than monthly unless called for in Attachment 1. Invoices shall be submitted to the attention of Symbiont's project manager indicating the project number noted on Attachment 1 at the following address:

Symbiont
6737 West Washington Street, Suite 3440
Milwaukee, Wisconsin 53214

Following Owner's payment to Symbiont, payment will be made by Symbiont to Subconsultant within 15 days for the approved invoice amount. Subconsultant invoices received after the 5th of the month will not be invoiced to Owner until the middle of the following month, which may result in delay in payment. If Symbiont objects to all or any portion of an invoice, Symbiont shall so notify the Subcontractor within fourteen (14) calendar days of the invoice date, identify the cause of disagreement, and pay when due that portion of the invoice, if any, not in dispute. In the event that Symbiont and the Subconsultant cannot resolve the dispute regarding invoiced amounts within thirty (30) days (or in a time frame mutually agreed to by both parties) after receipt by the Subconsultant of the aforementioned notice, the dispute shall be submitted to dispute resolution pursuant to Article 11, below.

Symbiont may, at its sole discretion, withhold payment to Subconsultant for failure of Subconsultant to provide a Certificate of Insurance pursuant to Article 13 below. Symbiont may withhold or offset payment to Subconsultant for failure to provide all lien waivers and other documents pursuant to Article 16 below.



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Article 3. Confidentiality

Symbiont and Subconsultant shall hold confidential all business or technical information obtained from the other or its affiliates or Client/Owner under this Agreement for a period of five (5) years after obtaining such information, and during that period shall not disclose such information without the disclosing party's consent except to the extent required for (1) performance of services under this Agreement; (2) compliance with professional standards of conduct for preservation of the public safety, health and welfare; (3) compliance with any law, regulation, ordinance, subpoena, court order or governmental request; or (4) protection of the disclosing party against claims or liabilities arising from performance of services under this Agreement. In the event disclosure may be required for any of the foregoing reasons, the disclosing party will, except where immediate

notification is required by law or regulation or is, in the judgment of Symbiont's counsel required to limit Symbiont's liability, notify the other party in advance of disclosure. The parties' obligations hereunder shall not apply to information in the public domain or information lawfully acquired on a non-confidential basis from others.

Article 4. Independent Contractor Relationship

The Subconsultant shall serve as an independent consultant to Symbiont and shall have control over and be responsible for the means and methods for providing services under this Agreement. Nothing contained in this Agreement will create any contractual relationship between the Owner and Subconsultant.

The Subconsultant acknowledges and agrees that it will not be an agent of Symbiont and will not have nor represent or hold itself, or allow any of its employees, agents, or Subconsultants to represent or hold itself or himself, out as having authority to bind Symbiont or to incur any obligation whatsoever on behalf of Symbiont. Symbiont shall not be liable to any party in any way for any engagement, obligation, commitment, contract, representation or transaction or any act or omission to act of the Subconsultant as provided in this Agreement.

Article 5. Representation and Warranty

The Subconsultant represents and warrants to Symbiont that the Subconsultant is experienced in the provision of the services to be performed under this Agreement and that such services shall be of a quality and a type usually and customarily provided by Subconsultants performing similar services in and around the locale of the project site.

If under this Agreement the Subconsultant performs any design services, Subconsultant represents and warrants to Symbiont that such design services shall be performed by and/or under the direction of an appropriately registered professional engineer or architect licensed to practice in the state of the subject project. The registered professional shall, upon completion of the design, stamp and certify all plans, specifications, calculations, etc. to certify his or her professional role in the project.

Article 6. Timeliness of Performance

The Subconsultant acknowledges that time is of the essence in completing its services under this Agreement.

Article 7. Force Majeure

Neither party to this Agreement will be liable to the other party for delays in performing the Scope of Work, or for the direct or indirect cost resulting from such delays, that may result from labor strikes, riots, war, acts of governmental authorities, extraordinary weather conditions or other natural catastrophe, or any other cause beyond the reasonable control or contemplation of either party.

In the event either party to the Agreement has knowledge of any actual or potential delay, that party shall notify the other party in writing of such cases in delay and its probable extent.

Article 8. Suspension

The Subconsultant will, upon ten (10) days written notice from Symbiont suspend, delay or interrupt all or a part of the Scope of Work. In such event, the Subconsultant will resume the Scope of Work upon written notice from Symbiont and an appropriate extension of time shall be mutually agreed upon and added to the Subconsultant's time of performance.



Article 9. Termination

Symbiont will have the right to immediately terminate this Subconsultant Agreement at its discretion upon written notice.

This Agreement may be immediately terminated by either party upon written notice in the event of substantial failure by the other party to perform in accordance with the terms hereof. After termination, Subconsultant will be ~~paid~~reimbursed for services rendered and reimbursed for all necessary expenses incurred to the termination date upon submission to Symbiont of detailed supporting invoices. Subconsultant will not be entitled to profit or other compensation on services not performed.

Either party may terminate this Agreement immediately upon written notice to the other party in the event that the other party becomes insolvent, files a petition in bankruptcy, is adjudicated bankrupt, has an assignee, referee, receiver or trustee appointed in any creditor action, has a petition in bankruptcy filed against it which is not vacated within thirty (30) days or suffers any analogous action.

Article 10. Notice to Parties

All notices required or permitted under this Agreement shall be in writing and shall be made to the parties' usual place of business.

Article 11. Dispute Resolution

Symbiont and Subconsultant shall provide written notice of a dispute within a reasonable time after the event giving rise to the dispute. Symbiont and Subconsultant agree to negotiate any dispute between them in good faith for a period of 30 days following such notice. Symbiont and Subconsultant may agree to submit any dispute to mediation, but such mediation shall not be required as a prerequisite to initiating a lawsuit to enforce this Agreement. Either party shall have the right to litigate the claim, dispute or other matter in question in any state or federal court located in New Jersey~~Milwaukee County, Wisconsin~~. In connection therewith, each party agrees to submit to the jurisdiction of such court.

In the event that legal action is brought by either party against the other in the Courts (including action to enforce or interpret any aspect of this agreement), the prevailing party shall be reimbursed by the other for the prevailing party's legal costs, in addition to whatever other judgments or settlement sums, if any, may be due. Such legal costs shall include, but not be limited to, reasonable attorney's fees, court costs, expert witness fees, and other documents expenses, in addition to any other relief to which it may be entitled.

Neither party will be responsible to the other for special or consequential damages including but not limited to, loss of profits, loss of investment or business interruption. The Subconsultant also agrees to seek recourse only against Symbiont and not its officers, employees, directors, or shareholders.

Article 12. Choice of Law

This Agreement shall be governed and construed in accordance with the laws of the State of New Jersey~~Wisconsin~~, without reference to conflicts of law principles. ~~Each party hereto consents to the exclusive jurisdiction of the state and federal courts located in Milwaukee County, Wisconsin for any actions, suits or proceedings arising out of or relating to this Agreement.~~

Article 13. Insurance

The Subconsultant declares and shall submit an insurance certificate that it maintains the following insurance coverage:

- A. Workers' Compensation:
of a form and in an amount as required by state law
- B. Employer's Liability:
\$1,000,000 per accident
\$1,000,000 disease, policy limit
\$1,000,000 disease, each employee



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- C. Commercial General Liability (bodily injury and property damage – combined single limit):
\$1,000,000 per occurrence
\$2,000,000 aggregate
- D. Contractor's Pollution Liability:
\$1,000,000 per occurrence
- E. Automobile Liability (owned, non-owned and hired vehicles):
\$1,000,000 combined single limit
- F. Professional Liability:
\$1,000,000 per occurrence
- G. Excess/Umbrella Liability:
\$2,000,000 per occurrence
\$2,000,000 aggregate

Symbiont and Owner shall be named as an additional insured with respect to Subconsultant's insurance policies described in lines C, D, E, and G above and Subconsultant waives subrogation against Owner and Symbiont as to all policies above and the Subconsultant shall furnish Symbiont with a Certificate evidencing the same.

All insurance certificates shall state that the insurance carrier will give Symbiont thirty (30) days notice of any cancellation or material change of the policies.

Any deductibles or self-insured retentions must be declared to and approved by Symbiont. At the option of Symbiont, either: the insurer shall reduce to a maximum of \$50,000 or eliminate such deductibles or self-insured retentions as respects Symbiont, its officials and employees or provide satisfactory financial evidence to Symbiont of the Subconsultant's ability to fund the deductible amount if necessary. Any self-insured retention or deductible amount on the policy shall not reduce the amount of collectible limits of liability.

If any of the aforementioned insurance policies are written on a claims-made basis, the Subconsultant warrants that continuous coverage will be maintained or an extended discovery period will be exercised for a period of one year-five years beginning from the time the work under this contract is completed.

The insurance companies providing the coverage shall maintain a minimum A.M. Best financial rating of at least A—.

Subconsultant agrees to indemnify and save Symbiont harmless from and against all liability, loss or expense (including costs and attorneys' fees) arising out of or in consequence of Subconsultant's failure to obtain the required coverages or to meet the other insurance requirements of this Agreement.

Neither Symbiont's failure to require or to insist upon certificates or other evidence of insurance, nor Symbiont's acceptance of a certificate or other evidence of insurance showing a variance from the specified coverage, changes or waives Subconsultant's obligation to comply with the insurance specifications of this Agreement.

Symbiont may, at its sole discretion, withhold payment to Subconsultant for failure of to provide a Certificate of Insurance. Symbiont's payment to Subconsultant shall not change or waive Subconsultant's obligation to comply with the insurance specifications of this Agreement.

Article 14. Indemnification

Symbiont and the Subconsultant mutually agree, to the fullest extent permitted by law, to indemnify and hold each other harmless from any and all damage, liability or cost (including reasonable attorneys' fees and costs of defense) arising from their own negligent acts, errors or omissions in the performance of their services/work under this Agreement, to the extent that each party is responsible for such damages and losses on a comparative basis of fault.

Subconsultant agrees, to the fullest extent permitted by law, to indemnify and hold Symbiont harmless from any and all damage, liability or cost (including reasonable attorneys' fees and costs of defense) arising from any lower-tier subconsultant's or subcontractor's negligent acts, errors or omissions in the performance of their services/work under this Agreement, to the extent that such lower-tier subconsultant or subcontractor is responsible for such damages and losses.



Article 15. Safety

Subconsultant shall take reasonable precautions to perform the Scope of Work in a safe manner and is responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Subconsultant's work. Subconsultant will be solely responsible for working conditions on those portions of the Project job site reasonably within Subconsultant's work area, including the safety of all persons and property during performance of the Scope of Work, in addition to providing any and all safety equipment or articles necessary to protect its employees and agents and to comply with applicable OSHA regulations and requirements of the Owner of the Project job site. Any monitoring of Subconsultant's procedures conducted by Symbiont will not include a review of the adequacy of Subconsultant's safety measures in, on, adjacent to, or near any Project job site. Symbiont's responsibility for Project job site safety is limited solely to its own employees and the provision of appropriate training, supervision and personal protective equipment for those employees.

An expression of concern by Symbiont regarding the Subconsultant's safety practices shall not be construed as usurping the responsibility of the Subconsultant for the safety of the Subconsultant's work.

Article 16. Assignment/Lower-Tier Subconsultants

This Agreement and the rights and duties hereunder shall not be assigned, subcontracted, or transferred by Subconsultant, in whole or in part, without Symbiont's prior written approval. Subconsultant shall inform Symbiont in writing of the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for any portion of the work subject to this Agreement. If Symbiont objects to any lower-tier subconsultant or supplier, such objection will be given in writing to Subconsultant within a reasonable period of time, specifying the basis for the objection. Subconsultant shall not contract with a lower-tier subconsultant or supplier reasonably objected to by Symbiont.

Prior to Symbiont's payment of progress payments and/or the final payment to Subconsultant, Subconsultant shall deliver proof satisfactory to Symbiont of full payment to all lower-tier subconsultants, suppliers, and for all labor, materials, supplies, machinery and equipment furnished for or used in performance of the Scope of Work identified in this Agreement. Such proof will include all necessary releases or waivers of liens supported by affidavits, all satisfactory to Symbiont, establishing that all liens and rights to claim liens which could arise out of performance of this Agreement, have been waived.

So long as Subcontractor has been paid on a timely basis for un-contested completed work. Subconsultant shall take all actions within its control (including the execution, acknowledgement, delivery and filing of such waivers, releases and other documents) to prevent any mechanics' or materialmen's liens or any other liens or encumbrances from being filed in respect of or placed upon any real property or improvements owned or leased by Symbiont or Owner as a result of or in connection with any work performed by or any other action or omission on the part of Subconsultant or any lower-tier subconsultants or suppliers or other person claiming by, through or under Subconsultant including, but not limited to, any liens or encumbrances arising by reason of the construction, use, occupancy, maintenance, repair or rebuilding of any such property or improvements or the furnishing of any labor, materials or supplies. If, notwithstanding the immediately preceding sentence, any mechanics' or materialmen's lien or other lien or encumbrance is filed in respect of or placed upon such property or improvements and if Subconsultant does not cause such lien or encumbrance to be fully and effectively released and discharged, or does not cause such lien or encumbrance to be bonded over in a manner acceptable to Symbiont and Owner, Symbiont shall be entitled, without prejudice to any other rights or remedies available to it, to pay directly to the holder of such lien or encumbrance all sums necessary to obtain its immediate release and discharge and to credit all sums so paid against any amount due or to become due to Subconsultant under or in connection with this Agreement or any other agreement with Subconsultant.

Article 17. Communication with Owner

All of the Subconsultant's written or verbal communication with or to the Owner, or with federal, state, or local agencies, relative to work under this Agreement must be through or with knowledge of Symbiont.

Article 18. Copies of Data

Unless otherwise called for in the Scope of Work, one legible copy each of all notes, field notes, drawings, prints, and plans prepared under the terms of the Subconsulting Agreement shall be delivered by the Subconsultant to Symbiont upon completion of the Scope of Work or termination of the Agreement.



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FORM SDB-3 02-2016

Article 19. Soliciting Employment

Neither party to this Subconsultant Agreement shall solicit an employee of the other party, nor hire or make an offer of employment to an employee of the other party, without prior written consent of the other party, during the time this Subconsultant Agreement is in effect.

Article 20. Waiver

No waiver by Symbiont of any term or condition set forth herein, whether by conduct or otherwise, in any one or more instances, shall be deemed or construed as a further or continuing waiver of any such term, condition or breach or a waiver of any other term, condition or breach.

Article 21. Headings

The subject headings in this Agreement are for convenience only and are not determinative of the substance of the subject clause.

Article 22. Entire Agreement

The parties agree that this Agreement, together with Attachment 1, represents the sole and entire integrated Agreement of the parties with respect to the project and supersedes all prior communications, negotiations, representations, quotations, offers or agreements, either written or oral between the parties hereto, with respect to the subject matter hereof, and no agreement or understanding varying or extending this Agreement shall be binding upon either Party, other than by a written agreement signed by both Subconsultant and Symbiont. If additional documents represent the agreement of the parties, such documents must be itemized, referencing this Article 22, in Attachment 1.

Article 23. Severability

If any provision or part of a provision of this Agreement is declared to be invalid by any tribunal of competent jurisdiction, such part shall be deemed automatically adjusted, if possible, to conform to the requirements for validity, but if such adjustment is not possible, it shall be deemed deleted from this Agreement as though it had never been included herein. In either case, the balance of any such provision and of this Agreement shall remain in full force and effect.

Article 24. Change Orders

Any amendments to this Agreement shall be executed by means of a written change order, signed by the Subconsultant and Symbiont. Changes to the Agreement will not become effective until the change order has been signed by both parties. The change order will document the specific changes to the Agreement along with any resulting adjustment in cost and/or schedule.

IN WITNESS WHEREOF, the parties have executed this Agreement including Attachment 1, which includes a description of the scope of work, schedule, method of compensation, and Supplemental Terms and Conditions of Agreement (if any), and is incorporated by reference into these Terms and Conditions of Agreement. This Agreement may be executed in counterparts, each of which shall constitute an original, but both of which when taken together shall constitute one and the same agreement. The parties agree that a counterpart of this Agreement may be executed by a party and then delivered to the other party by facsimile or other electronic means, and such facsimile or other electronic copy will constitute an original counterpart. The signatories below represent that they are duly authorized by the business entities they represent to sign this Agreement. The effective date of this Agreement is the later of the signature dates below.



FORM SDB-3 02-2016

Subconsultant: Ground Improvement Services, Inc.

Kenneth J. Leahy Chief Operating Officer 2/8/18
Name: Kenneth J. Leahy Title Date

Symbiont Design-Build, LLC:

Brian Tild Vice President 02/08/18
Name: Title Date



FORM SDB-3 02-2016

**ATTACHMENT 1
TO SYMBIONT® DESIGN-BUILD, LLC
SUBCONSULTANT
PROFESSIONAL SERVICES AGREEMENT**

Project Name	Trenton Biogas Digester Foundation Design and Permitting Assistance
Project No.	DB180999
Subcontractor	Ground Improvement Services, Inc. PO Box 918 Purcellville, VA 20134 <u>Steward Station, PM</u> <u>703-869-7495</u> <u>Attn: Kurt Levine, P.E.</u> <u>862-763-0468</u>
Owner	Trenton Biogas, LLC
Site Location	Trenton Biogas 1600 Lamberton Road Trenton, NJ 08611
Scope of Work	Scope of work shall consist of soil improvement system design services as summarized in Ground Improvement Services, Inc. quote dated 01/30/18 for three (3) digester tanks and one buffer tank for the proposed Trenton Biogas Facility in Trenton, NJ. All design documents shall be stamped by a registered professional engineer licensed in the state of New Jersey. The deliverable for this project shall be stamped design drawings and calculations for use by the Owner to obtain a construction permit from the local permitting authority.
Compensation	Lump sum fee of \$47,800 Provide invoices to the attention of Brian Till that identify the Symbiont project number DB180999 and delineates the scope of work provided.
Schedule	Time is of the essence. All design work must be completed within two weeks of receipt of final design loads.
Supplemental Conditions	<ol style="list-style-type: none"> 1. The Owner is an intended third-party beneficiary to this Agreement. This Agreement is assignable to Owner, without further consent or approval by Subconsultant, upon Owner's written request following default by Symbiont or termination or expiration of the Contract between Owner and Symbiont. 2. Subconsultant shall enter into a new contract directly with the Owner on the same terms and conditions as this Agreement in the event that any trustee in bankruptcy for Symbiont rejects this Agreement, or the Subconsultant terminates this Agreement as a result of the bankruptcy of Symbiont.



FORM SDB-3 02-2016

	<p>3. Subconsultant shall provide reasonable cooperation and further assurances in connection with Owner's efforts to obtain debt and/or equity financing for the Project facility as Owner shall reasonably request and shall use commercially reasonable efforts to cause its lower-tier subcontractors to do the same. Without limiting the foregoing, within twenty (20) business days after Owner's written request, Subconsultant shall execute and deliver to Owner a written consent in a form satisfactory to Owner, and such consents to assignment and related agreements as shall be typical in project finance transactions on the form customarily used by such financing parties, for the benefit of Owner's financing parties, in either case together with such changes as the financing parties shall reasonably request. Any costs (including reasonable attorney's fees) incurred by Subconsultant in connection with complying with the terms of this provision, including any legal opinions required to support any such financing party consents, shall be at Owner's costs and shall be in addition to the Compensation in Attachment 1 of this Agreement.</p> <p>4. Article 16 – Insurance. Item F, Professional Liability. Subconsultant shall provide an insurance certificate with \$5,000,000 per occurrence of Professional Liability Insurance.</p>
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EXHIBIT “B”

Trenton Biogas – Trenton, New Jersey
Amec Foster Wheeler Project No. 178122

SECTION 01 10 29 - SCOPE OF WORK – SOIL IMPROVEMENTS

PART 1 GENERAL

1.1 PROJECT INFORMATION

- 1.1.1 Project Name: Trenton Biogas
- 1.1.2 Owner's Name: Trenton Biogas LLC
- 1.1.3 Engineer's Name: Amec Foster Wheeler
- 1.1.4 Construction Manager's Name: Amec Foster Wheeler

1.2 BACKGROUND

- 1.2.1 Trenton Biogas LLC is upgrading the existing (currently not being used) Mercer County Regional Sludge Management Facility to a food product to energy facility. The proposed facility will use food products, pharmaceutical grade alcohols, and glycerin to produce methane, compost, and fertilizer. The facility is located at 1600 Lamberton Road, Trenton, NJ.
- 1.2.2 The site is located on a site with marginal soils deemed too inconsistent to support the three 1.3M gallon digester tanks and one buffer tank.

PART 2 DESCRIPTION OF WORK

2.1 SUMMARY OF WORK

- 2.1.1 Provide and install soil improvement system to improve soil bearing capacity under three digester tanks (T-12100, T-12200, T-12300) and one buffer tank (T-10400) foundations. Reference drawings D-000-M-100 and D-020-S-100.
- 2.1.2 Soil improvement system may consist of the following:
 - 2.1.2.1 GeoStructure Inc.: Geo-Piers
 - 2.1.2.2 Hayward Baker: Vibro-Piers or Vibro Concrete Columns
 - 2.1.2.3 Menard Group USA: Vibro-Stone Columns
 - 2.1.2.4 Or Owner approved equivalent soil improvement system.
- 2.1.3 Soil improvement system shall be designed to comply with Performance Design Criteria listed on the D-020-S-100 drawing and the Geotechnical Engineering Evaluation Report dated June 29, 2016 prepared by GZA GeoEnvironmental Inc. See the report for information on soils and overall site condition.
- 2.1.4 Soil improvement Criteria:
 - 2.1.4.1 Allowable Soil Bearing Pressure for gravity loads: 4,600 PSF minimum.
 - 2.1.4.2 Allowable Soil Bearing Pressure for gravity plus seismic loads: 7,600 PSF minimum.
 - 2.1.4.3 Maximum long-term settlement under tanks: up to 2-inches.
 - 2.1.4.4 Maximum differential settlement: ½-inch.
- 2.1.5 Soil improvement contractor shall perform condition survey of the existing building and of the Waste Water Treatment tanks to the north to monitor potential detrimental effects to structures from soil improvement system installation. Submit condition survey plan to Engineer prior to starting work.
- 2.1.6 See drawing D-020-S-100 for approximate area of soil improvement required and drawing D-020-S-500 for tank foundation plans and details.
- 2.1.7 Soil improvement system shall have drawings and calculations prepared, sealed and signed by a registered professional licensed in the State of New Jersey.
- 2.1.8 Soil improvement system submittal shall be submitted to Engineer for review prior to installation.

Trenton Biogas – Trenton, New Jersey
Amec Foster Wheeler Project No. 178122

- 2.1.9 See drawing D-000-S-010 for Structural General Notes, D-000-S-012 for Special Inspections required and drawings D-000-S-100 and D-000-S-101 for overall site layout and area plans.

2.2 WORK NOT INCLUDED

- 2.2.1 Reinforced concrete work.
2.2.2 Helical anchors.

PART 3 EXECUTION

3.1 CONTRACTOR RESPONSIBILITIES

- 3.1.1 Subcontractor will be responsible for the supply of labor, materials, consumables, equipment, tools, QA/QC, insurance, supervision and project management as required for the scope of work.
- 3.1.2 Work shall be performed in accordance with the referenced project documents, project schedule, special conditions and this Scope of Work.
- 3.1.3 The Scope of Work is for a complete job and encompasses all facets of the work. Any complementary work necessary to complete the job is also included. These include but are not limited to:
- 3.1.4 Mobilization/Demobilization
- 3.1.5 Evaluating existing conditions.
- 3.1.6 Disposal of any spoils.
- 3.1.7 Location of all underground utilities in the area of work.
- 3.1.8 Coordination with underground utilities and electrical grounding requirements.
- 3.1.9 Code requirements for working near existing roadway and wetlands.
- 3.1.10 Safety requirements for working near active underground electrical duct banks.
- 3.1.11 Quality control testing during placement of soil improvements.
- 3.1.12 Quality assurance coordination with Owner Inspection Agencies.
- 3.1.13 Subcontractor is responsible for all weather protection;
- 3.1.14 Report Progress – Quantity complete on a weekly basis.
- 3.1.15 Quality control plan and procedures.
- 3.1.16 Submittals as called out in project drawings and specifications.
- 3.1.17 Clean up of all waste generated by this scope of work.

PART 4 DOCUMENT LIST

4.1 DRAWINGS

- 4.1.1 D-000-S-010, D-000-S-011, D-000-S-012, D-000-S-100, D-000-S-101, D-000-S-500, D-020-S-100, D-020-S-101, D-020-S-500,
- 4.1.2 General Arrangement Drawings.

4.2 OTHER DOCUMENTS

- 4.2.1 Geotechnical Engineering Evaluation Report dated June 29, 2016 prepared by GZA GeoEnvironmental Inc.

END OF SECTION 01 10 29

EXHIBIT “C”

SYMBIONT/SUBCONTRACTOR CHANGE ORDER



DISTRIBUTION TO:

Symbiont PM _____
Contractor _____
Central File _____

PROJECT: Trenton Biogas
(Name & Address)

CHANGE ORDER NUMBER: 1

1600 Lambertson Road

INITIATION DATE: 5/30/2018

Trenton, NJ 08611

PROJECT MANAGER: Brian Till

TO CONTRACTOR: Ground Improvement Services
(Name & Address)

CONTRACT SERVICES: Soil Improvement

PO Box 918

CONTRACT DATE: 2/8/2015

Purcellville, VA 20134

You are directed to make the following changes in this Contract:

Grouted impact pier foundation system construction per Ground Improvement Services design documents dated 4/4/18 and Ground Improvement Services proposal No. 7820 RI dated 1/20/18. Scope of work includes mobilization, modulus test, three (3) digester RI elements, and one (1) buffer tank RI elements.

Not valid until signed by the Symbiont Representative and CONTRACTOR.

CONTRACTOR agrees that this Change Order includes any and all costs associated with or resulting from the change ordered herein, including all impacts, delays, and accelerated costs. Other than the dollar amount and time allowance listed above, there shall be no other dollar or time compensation as a result of this Change Order.

The original Contract Price.....	\$	47,800.00
Net change by previously authorized Change Orders.....	\$	-
Net increase / (decrease) of this Change Order.....	\$	551,110.00
Revised Contract Price including this Change Order.....	\$	598,910.00
The Contract Time will be (increased)/(decreased) by.....	N/A	Days
The revised Date of Substantial Completion is.....	N/A	

Ground Improvement Services

CONTRACTOR (Company Name)

PO Box 918
Purcellville, VA 20134
ADDRESS

By (Signature)

DATE

SYMBIONT

6737 West Washington Street, Suite 3440
West Allis, Wisconsin 53214
414-291-8840
Fax: 414-291-8841
ADDRESS

By (Signature)

DATE

Brian Till 05/30/18

TRUSTED FOR GOOD REASON.

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEW JERSEY**

<p>SYMBIONT SCIENCE, ENGINEERING AND CONSTRUCTION, INC.; ZURICH AMERICAN INSURANCE COMPANY a/s/o Symbiont Science, Engineering and Construction, Inc.; AMERICAN GUARANTEE AND LIABILITY INSURANCE COMPANY, a/s/o Symbiont Science, Engineering and Construction, Inc. and STEADFAST INSURANCE COMPANY a/s/o Symbiont Science, Engineering and Construction, Inc.,</p> <p>Plaintiffs</p> <p>vs.</p> <p>GROUND IMPROVEMENT SERVICES, INC.; JOHN DOES 1-10, (fictitious parties) and ABC COMPANIES 1-10 (fictitious parties); GEOSTRUCTURES OF VIRGINIA, INC.</p> <p>Defendants.</p>	<p>CIVIL ACTION NO. 3:22-04905</p> <p>CERTIFICATE OF FILING AND SERVICE</p>
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I hereby certify that on October 12, 2022, a copy of the foregoing which was electronically filed and served by mail on anyone unable to accept electronic filing. Notice of this filing will be sent by e-mail to all parties by operation of the Court's electronic filing system or by mail to anyone unable to accept electronic filing as indicated on the Notice of Electronic Filing. Parties may access this filing through the Court's CM/ECF System.

s/Daniel C. Theveny
Daniel C. Theveny (046701984)